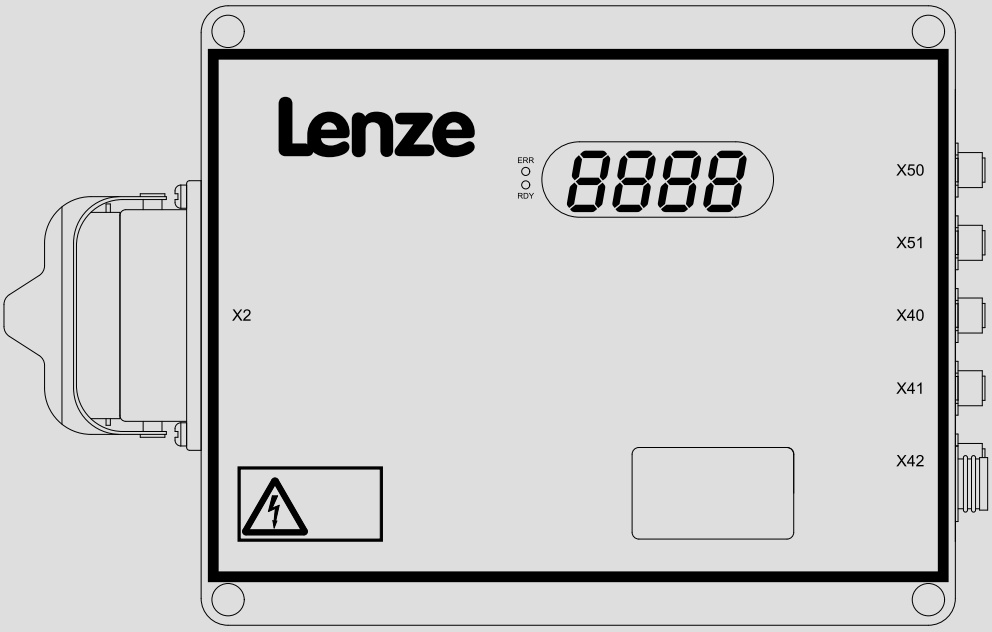
LDEDS-CCU210B
13416903

System Manual

LDEC



LDECBBF1xxxxxxHx

Carriage control systems for monorail overhead conveyors

Lenze

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1 About this documentation

Contents

The System Manual provides full information on the intended use of the carriage control system for monorail overhead conveyors.

Information on customised designs can be found in a separate documentation supplied with the product.

Validity

Type	Type designation	from hardware version	from software version
LDEC carriage control	LDECBBF1xxxxxxHW	-	V3.00
LDEC carriage control with half-wave coding	LDECBBF1xxxxxxHC	-	V3.00

Target group

This System Manual is directed to all persons dimensioning, installing, commissioning and adjusting monorail overhead conveyors with carriage control systems.

Tip!

Information and auxiliary devices related to the Lenze products can be found in the download area at

http://www.Lenze.com

1.1 Document history

Material number	Version			Description
13202797	1.0	04/2007	TD00	First edition
13238907	2.0	02/2008	TD03	New product designation
13240731	2.1	03/2008	TD03	UL formulation has been removed from the specification; Spark suppressor has been replaced by freewheeling diode
13285774	3.0	09/2009	TD03	Description of CAN interface added
13416903	4.0	09/2012	TD29	”Function library” chapter extended; ”Troubleshooting and fault indications” and ”Code list” chapters revised

1.2 Conventions used

Type of information	Identification	Examples/notes
Spelling of numbers		
Decimal separator	language-dependent	In each case, the signs typical for the target language are used as decimal separators. For example: 1234.56 or 1234,56
Text		
Program name	» «	PC software For example: »Engineer«, »Global Drive Control« (GDC)
Icons		
Page reference	🕮	Reference to another page with additional information For instance: 🕮 16 = see page 16
Documentation reference	🌍	Reference to another documentation with additional information For example: 🌍 EDKxxx = see documentation EDKxxx

1.3 Notes used

The following pictographs and signal words are used in this documentation to indicate dangers and important information:

Safety instructions

Structure of safety instructions:

Danger!

(characterises the type and severity of danger)

Note

(describes the danger and gives information about how to prevent dangerous situations)

Pictograph and signal word	Meaning
Danger!	**Danger of personal injury through dangerous electrical voltage.** Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
Danger!	**Danger of personal injury through a general source of danger.** Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
Stop!	**Danger of property damage.** Reference to a possible danger that may result in property damage if the corresponding measures are not taken.

Application notes

Pictograph and signal word	Meaning
Note!	Important note to ensure troublefree operation
Tip!	Useful tip for simple handling
	Reference to another documentation

2 Safety instructions

2.1 General safety and application notes for Lenze control systems

(in accordance with Low-Voltage Directive 2006/95/EC)

General

Lenze controls can have live, even moving or rotating parts during operation - according to their enclosure. Surfaces can be hot.

The unauthorised removal of the required cover, improper use, incorrect installation or operation will risk serious personal injury and damage to property.

Additional information can be found in the documentation.

All work concerning transport, installation, commissioning and maintenance may only be performed by qualified technical personnel (observe IEC 364 or CENELEC HD 384 or DIN VDE 0100 and IEC report 664 or DIN VDE 0110 and national regulations for the prevention of accidents).

Qualified technical personnel within these basic safety instructions are persons who are familar with installation, assembly, commissioning and operation of the product and who have the respective qualifications for their work.

The Hardware Manual contains important safety instructions and notes with regard to the connection and commissioning of the control system, which you have to observe. Therefore always keep the Hardware Manual near the control system.

The Hardware Manual always has to be complete and in a perfectly readable state.

Application as directed

The Lenze control system is designed for operation on a travelling drive (short-time brake applications permissible only). Without protection of persons (optional) the control system is not suitable for hoist applications!

Lenze control systems are components intended for installation in electrical systems or machines. They are not household appliances, but are designed as components exclusively for application for commercial or professional use according to EN 61000-3-2. The documentation contains notes for maintaining the limit values to EN 61000-3-2.

If the control systems are installed in machines, commissioning (i.e. starting operation as directed) is prohibited until it has been determined that the machine corresponds to the regulations of EC Directive 98/37/EC (Machinery Directive); observe EN 60204.

The commissioning (i.e. starting the intended operation) is only allowed if the EMC Directive (89/336/EEC) is met.

The Lenze control systems meet the requirements of Low-Voltage Directive 2006/95/EC. The harmonised standards of the EN 61800-5-1, EN 61800-3, EN 61800-2 series are applied to the Lenze control systems.

Technical data and connection requirement information appear on the nameplate and in the documentation. They must be observed.

Warning: The control systems are products for the use in a second environment in accordance with EN 61800-3 (industrial environment). These products can cause radio interferences in residential areas. In this case it may be required for the operator to implement corresponding measures.

Transport, storage

Observe the notes for transport, storage and proper handling.

Observe the climatic conditions according to EN 61800-2.

Installation

The control systems must be set up and cooled according to the regulations of the accompanying documentation.

Ensure careful handling and avoid mechanical overload. Do not bend any components during transport or handling or change insulation distances. Do not touch any electronic components or contacts.

Lenze control systems contain electrostatic sensitive components that can easily be damaged by improper handling. To avoid risks to health, do not damage or destroy any electrical components!

Electrical connection

When working on live control systems, observe the applicable national regulations for the prevention of accidents (e.g. VBG 4 in Germany).

Perform the electrical installation in accordance with applicable regulations (e.g. cable cross-sections, fusing, PE connections). The documentation contains additional notes.

The documentation contains notes for EMC-compliant installation (shielding, earthing, arrangement of filters and routing of cables). Also observe these notes for direct control systems bearing the CE mark. The manufacturer of the system or machine is responsible for maintaining the limit values required by EMC regulations.

Operation

You may have to fit additional monitoring and protection devices to systems with built-in Lenze control systems in accordance with relevant safety regulations (e.g. law on technical equipment, regulations for the prevention of accidents). You may adjust the Lenze control systems to your application. Observe the notes in the documentation for this purpose.

Keep all protective covers closed during operation.

Service and maintenance

The Lenze control system is maintenance-free, provided that the prescribed operating conditions are complied with.

Disposal

Send metals and plastics for recycling. Dispose of assembled PCBs properly.

Observe the product-specific safety and application notes in these instructions!

2.2 Residual hazards

Protection of persons

- The **X1** power connector contacts (supply via flat connector field) can conduct hazardous voltages if the control system is connected to the mains. Therefore disconnect the control system before carrying out any work on it.
- The **X2** power connector contacts also conduct hazardous voltages. Depending on the risk analysis of the machine/system, you may have to take additional protective measures.
- If the status LEDs and other display elements go out, this does not indicate that the control system is disconnected from the mains and is deenergised.
- During operation, the control system has to be closed.
- The current collector may only be touched 3 minutes after disconnection from the mains. Before carrying out any work on the control system, check whether all power terminals are deenergised. The control system may not be short-circuited.
- Operation at ambient temperatures > 50 °C:
  - The operating temperature of the control system housing is > 60 °C.
  - Depending on the risk analysis on the machine/system, you may have to use additional protective covers.

Motor protection

- The connected motor can overheat if
  - motors that do not feature temperature monitoring with PTC thermistor (PTC) or thermal contact (NC contact) are operated on the control system.
  - the temperature monitoring with PTC thermistor (PTC) or thermal contact (NCcontact) is not connected to the control system
  - the temperature monitoring is switched off (C0120 = 0).
  - the temperature monitoring is set to ”Warning” (C0120 = 2).

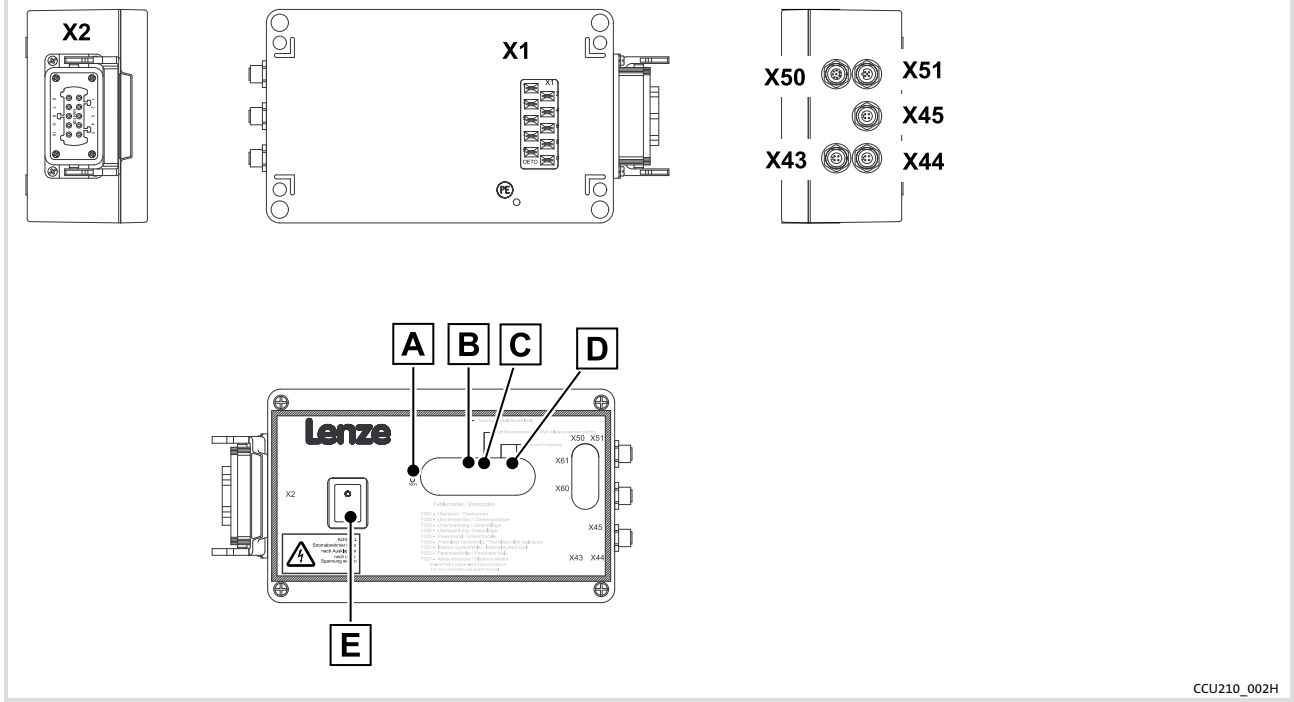
3 Device description

3.1 Device features

Vehicle control system	Description
LDECBBF1xxxxxxHW LDECBBF1xxxxxxHC 0.75/ 1.5/ 2.2 kW	• Travelling drive for monorail overhead conveyors (MOC), frequency-controlled • Energy supply 3/PE/PEN AC 360 V - 0 % ... 528 V + 0 % • Connection of an external data memory to the control system • Halve wave selection • Halve wave feedback signal • Display: 7-segment LED display red for status display, error messages, special display

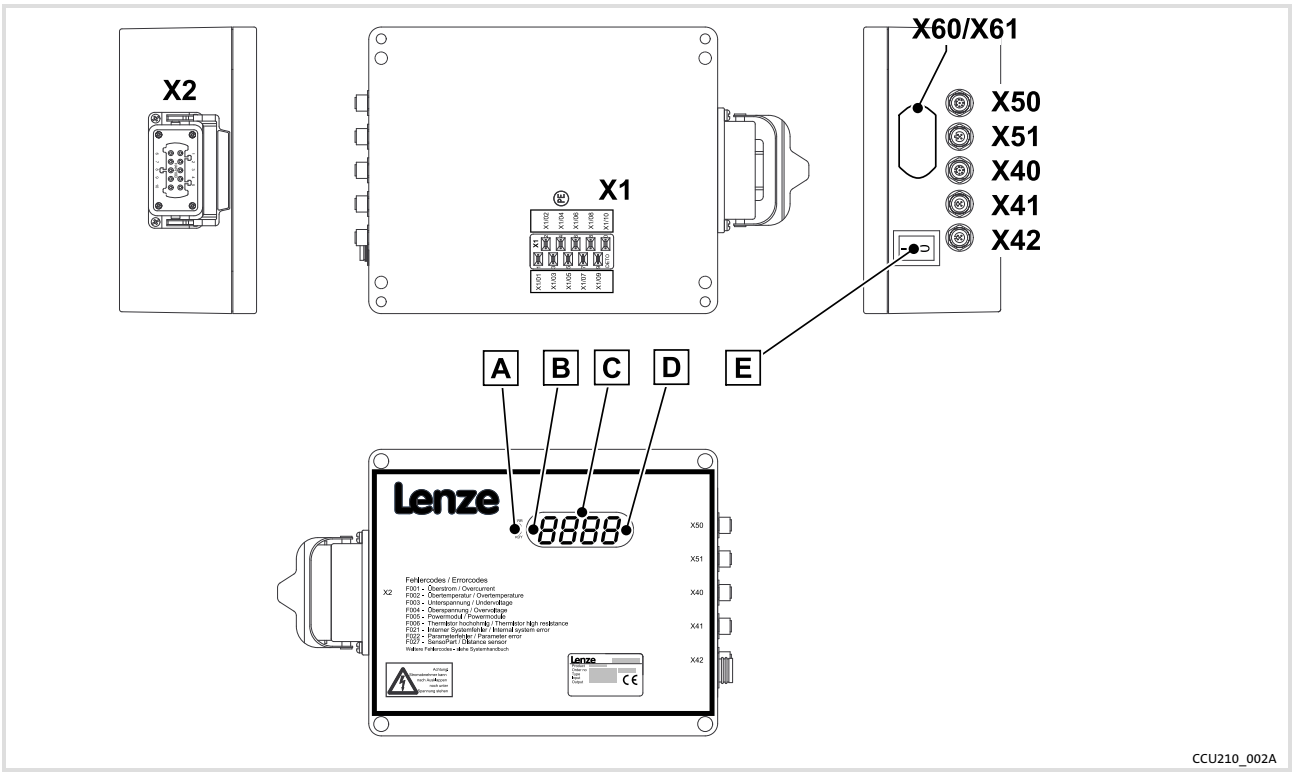
3.2 Overview

Power 0.75 kW



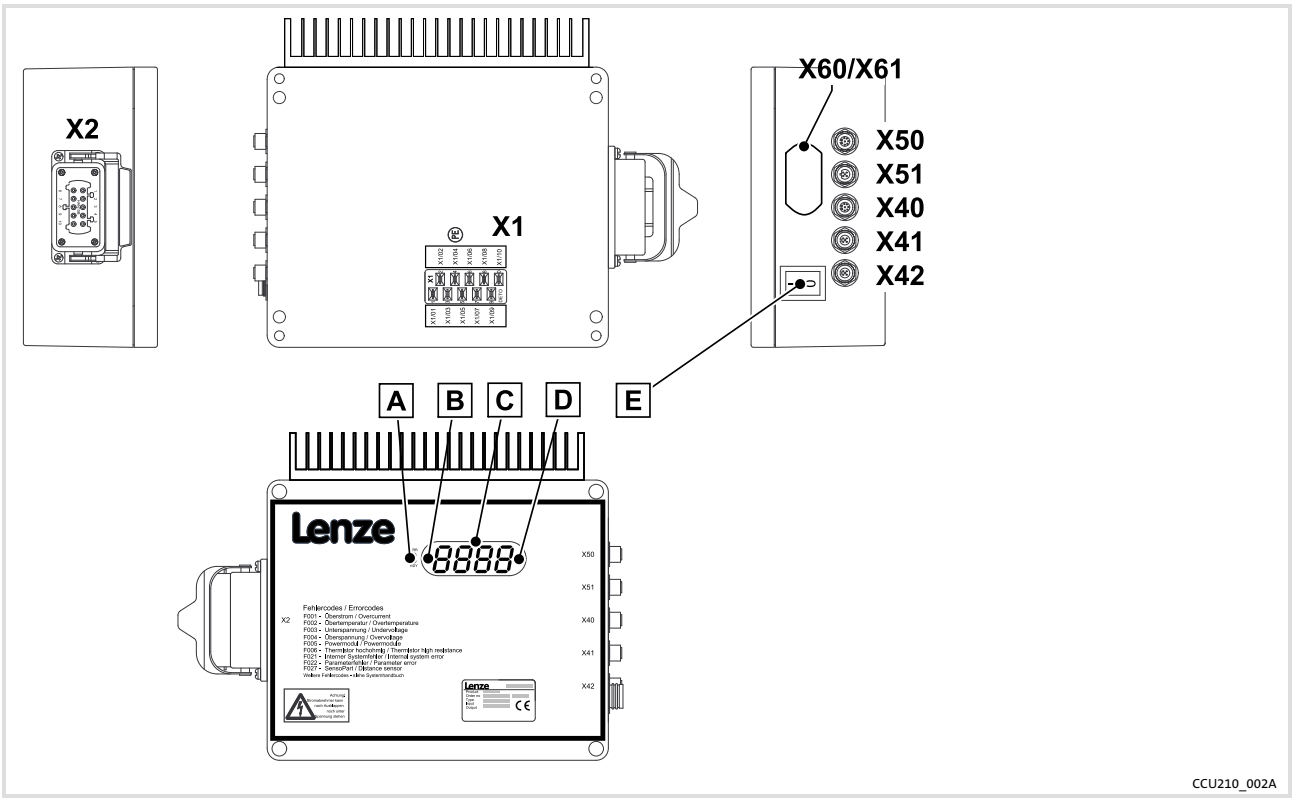
Operational control and connections			
Pos.	**Function**	**Description**	
A	Important fault messages	Short description of the most important fault messages	81
B	Status display of device (LED)	Readiness for operation, error	78
C	Infrared receiver ...		
	... for infrared data transmission (IrDA)	Parameter setting, manual operation and status enquiries via PDA	65
	... for infrared remote control (IrRC)	Manual operation via infrared remote control	68
D	4-digit 7-segment display	Status display, error messages, warning signals	79
E	On/Off switch	Software deactivation, acknowledgement of errors	
X1	Mains connection	Connector: flat connector, 10-pole	31
X2	Motor connection	Connector: socket, Harting HAN-10B, 10-pole + PE	32
X43	Digital inputs DIN1/DIN2	Connector: socket, 8-pole, M12	34
X44	Digital inputs DIN3/DIN4 Digital output DOUT1	Connector: socket, 4-pole, M12	34
X45	Digital inputs DIN5, DIN6 Digital output DOUT2	Connector: socket, 4-pole, M12	35
X50	Connection of external data memory	Connector: socket, 8-pole, M12	33
X51	Connection of anti-collision sensor	Connector: socket, 5-pole, M12, B-coded	33
X60	System bus (CAN) connection (behind the cover)	RJ45 connector	33
X61			

Power 1.5 kW



Operational control and connections			
Pos.	**Function**	**Description**	
A	Important fault messages	Short description of the most important fault messages	81
B	Status display of device (LED)	Readiness for operation, error	78
C	Infrared receiver ...		
	... for infrared data transmission (IrDA)	Parameter setting, manual operation and status enquiries via PDA	65
	... for infrared remote control (IrRC)	Manual operation via infrared remote control	68
D	4-digit 7-segment display	Status display, error messages, warning signals	79
E	On/Off switch	Software deactivation, acknowledgement of errors	
X1	Mains connection	Connector: flat connector, 10-pole	31
X2	Motor connection	Connector: socket, Harting HAN-10B, 10-pole + PE	32
X40	Digital inputs DIN3 ... DIN7 Digital output DOUT2	Connector: socket, 8-pole, M12	33
X41	Digital input DIN2 Digital output DOUT1	Connector: socket, 4-pole, M12	34
X42	Digital inputs DIN1, DIN8	Connector: socket, 4-pole, M12	34
X50	Connection of external data memory	Connector: socket, 8-pole, M12	33
X51	Connection of anti-collision sensor	Connector: socket, 5-pole, M12, B-coded	33
X60	System bus (CAN) connection (behind the cover)	RJ45 connector	33
X61			

Power 2.2 kW



Operational control and connections			
Pos.	**Function**	**Description**	
A	Important fault messages	Short description of the most important fault messages	81
B	Status display of device (LED)	Readiness for operation, error	78
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	... for infrared remote control (IrRC)	Manual operation via infrared remote control	68
D	4-digit 7-segment display	Status display, error messages, warning signals	79
E	On/Off switch	Software deactivation, acknowledgement of errors	
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X40	Digital inputs DIN3 ... DIN7 Digital output DOUT2	Connector: socket, 8-pole, M12	33
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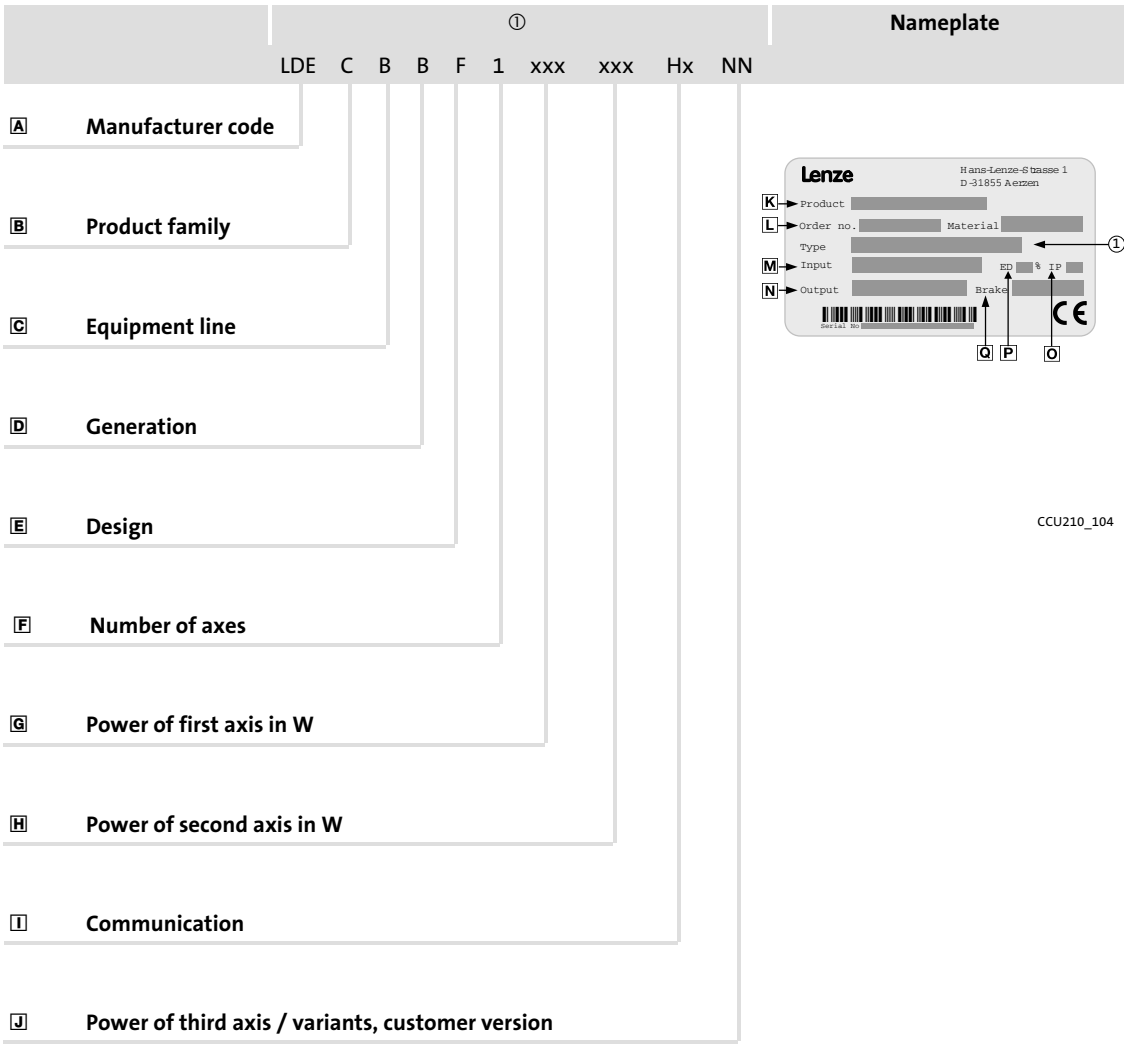
X42	Digital inputs DIN1, DIN8	Connector: socket, 4-pole, M12	34
X50	Connection of external data memory	Connector: socket, 8-pole, M12	33
X51	Connection of anti-collision sensor	Connector: socket, 5-pole, M12, B-coded	33
X60	System bus (CAN) connection (behind the cover)	RJ45 connector	33
X61			

3.3 Type code

This documentation is valid for LDEC carriage control systems as of nameplate data:



Further information	
K	Product designation
L	Order number
M	Input data of frequency inverter
N	Output data of frequency inverter
O	Degree of protection
P	Operating time in %
Q	Brake

Legend for LDECBBF1xxxxxxHW type code	
A Manufacturer code	
LDE	Lenze
B Product family	
L	Local control unit
I	Inductive control unit
C	Conductive control unit
Z	General accessories
C Equipment line	
B	Baseline
S	Stateline
H	Highline
D Generation	
A	1st generation
B	2nd generation
E Design	
F	Frequency inverter
M	Motor starter
P	Pole-changing control system
F Number of axes	
1	1 axis
2	2 axes
3	3 axes
S	Special axes
G Power of first axis in W	
xxx	e.g. 751= 75 x 10^1 W = 750 W
H Power of second axis in W	
xxx	e.g. 123 = 12 x 10^3 W = 12kW

I Communication			
DB	Rail bus	IB	Interbus
DN	DeviceNet	IN	Inductive
EI	Ethernet/IP	PB	Profibus
EP	Ethernet Powerlink	PW	Powerwave
ER	PROFInet	RF	Radio frequency
ET	Ethercat	SC	Sercos
HC	Half wave (HWC=half wave code)	WL	WLAN
HW	Half wave		

J Power of third axis / variants, customer version	
01	= 0.55kW
02	= 0.75kW
03	= 1.1kW
04	= 2.2kW
05	= 4.0kW
06	= 7.5kW
07	= 10.0kW
AA	Labelling (variants_customer version)
Other characters	
NN	Not relevant
x	For the entry of numbers

4 Technical data

4.1 General data and operating conditions

General data

Conformity and approval		
Conformity		
CE	2006/95/EC	Low-Voltage Directive
	93/68/EEC	EMC Directive (basis 89/336/EEC)

Protection of persons and equipment		
Degree of protection	EN 60529	IP54
		Cover all unused connectors with protective caps or dummy plugs. The cover over X60/X61 has to be available.
Earth leakage current	EN 61800-5-1	< 3.5 mA
Insulation of control circuits	EN 61800-5-1	Safe mains isolation by double (reinforced) insulation
Insulation resistance	EN 61800-5-1	< 2000 m site altitude: overvoltage category III
		> 2000 m site altitude: overvoltage category II
Protective measures		Against motor overtemperature (input for PTC or thermal contact), overcurrent at output

EMC		
Noise emission	EN 61800-3	Compliance with the limit values for the 2. environment (industrial premises): category C3
Noise immunity	EN 61800-3	Compliance with the limit values for the 2. environment (industrial premises): category C3

Operating conditions

Ambient conditions			
Climatic			
Storage	IEC/EN 60721-3-1	1K3 (-25 ... +70 °C)	< 6 months
		1K3 (-25 ... +40 °C)	> 6 months > 2 years: form DC-bus capacitors
Transport	IEC/EN 60721-3-2	2K3 (-25 ... +70 °C)	
Operation	IEC/EN 60721-3-3	3K3 (0...+45 °C) > +40 °C: reduce the rated output current by 2.5%/°C.	
Pollution	EN 61800-5-1	Degree of pollution 2	
Site altitude		< 4000 m amsl > 1000 m amsl: reduce the rated output current by 5 %/ 1000 m.	
Mechanic			
Vibration resistance			
Storage	Germanischer Lloyd	Vibration test 1	
Transport	EN 60721-3-2	2M2	
Operation			
	EN 60721-3-3	3M4	
	EN 60721-3-7	7M2	
Electric			
Mains connection			
Mains system			
TT, TN (earthed neutral)		Operation permitted without restrictions.	
IT		Operation permitted without restrictions.	
Motor connection			
Length of the motor cable		< 5 m from motor connector	
Cable type		Shielded servo cable (e. g. LAPP: Ölflex servo, FD-755-CP)	

Mounting conditions		
Mounting place		On monorail overhead conveyors
Mounting position		Vertically, control connections laterally on the right
Mounting clearances		
at the top		Typically 150 mm The actual free space is determined by the connectors used and the cable bending radii.
at the bottom		
to the sides		

4.2 Rated data

Note!

The frequency inverter is not suitable for permanent operation in generator mode.

Mains voltage				
Voltage range	U_N	3/PE/PEN AC 360 V - 0 % ... 528 V + 0 %		
Frequency	f_N	45 Hz - 0 % ... 65 Hz + 0 %		
Fusing		10 A-T/AC 500 V		
Frequency inverter (data for operation on 3/PE/PEN AC 400 V, switching frequency 8 kHz)				
Starting current				
Effektive	I_{eff} [A]	4		
Peak	I_{peak} [A]	6		
Rated power (typical MOC application)				
Operating time 70 %	P_N [kW]	0.75	1.5	-
Operating time 50 %	P_N [kW]	-	-	2.2
Typical motor power 4-pole asynchronous motor, Y connection	P_N [kW]	-	-	2.2
Max. output power	S_N [kVA]	1.3	2.0	3.9
Output current				
Duration	I_N [A]	1.8	3.5	5.6
For 60 s	I_{max} [A]	3.0	5.0	10
Switching frequency				
Optionally	f [kHz]	2, 4, 8		
Lenze setting	f [kHz]	8		
Motor output frequency	f [Hz]	0 ... 120 variable		
Power loss at rated load	P_V [W]	22	60	100
Power loss in idle state (only half wave power, 24V-sensors are not connected)	P_V [W]	6	6	6
DC motor brake control				
Brake voltage				
Duration (U = U_N x 0.45)	U [V DC_{eff}]	185 (for U_N = 400 V AC)		
Peak (U_{peak} = U_N x $\sqrt{2}$)	U_{peak} [V DC]	564 (for U_N = 400 V AC)		
Max. braking current	I [A_{eff}]	0.5 ± 10 %		
Integrated switched-mode power supply (supply for external encoders and actuators)				
Output voltage	U_A [V DC]	+24 (21.6 ... 26.4 V DC)		
Max. output current (current-limited)	I_A [A DC]	0.5	0.7	0.7
Weight				
Control system complete, without counter plug	[approx. kg]	2.8	3.4	5.0

Half wave system			
Control bar			
Z system		No	
Number		2	
Signal level		Full wave	
		Positive half wave	
		Negative half wave	
Reference voltage or switched voltage		L3 L1 possible with different hardware configuration	
Rated voltage		400 ... 480 V AC, 50-60 Hz	
Switching threshold		50 Hz: 270 V AC (243 ... 297 V AC) 60 Hz: 330 V AC (297 ... 363 V AC)	
Power consumption		1.5 W (400 V AC)	for 1 x half wave
Message bar			
Number		1	
Signal level		Full wave	
		Positive half wave	
		Negative half wave	
Reference voltage or switched voltage		L3 L1 possible with different hardware configuration	
Short-circuit protection		PTC protection (500 Ω in series)	
Reference voltage		400 ... 480 V	
Switching current		max. 28 mA AC	
Sensor technology			
Digital inputs			
Number		8	
Level		HIGH	+16 .... +26.5 V DC
		LOW	0 .... 4 V DC
Input current		Typ. 4 mA at 24 V DC	
Digital outputs			
Number		2	
Level		HIGH	+19 .... +26.4 V DC
		LOW	0 .... 4 V DC
Output current		Max. 200 mA per output	If inductive loads are switched, external freewheeling diodes are required!
Serial interface	RS485	SensoPart protocol	
Parameter setting and configuration			
IrDA interface		Serial IrDA interface for parameter setting Range typ. 300 mm	
CAN interface		For parameter setting and configuration	
Manual control			
IR-RC interface		Manual operation using infrared remote control	
External data memory			
Storage space		Max. 2 kB	Depending on the application

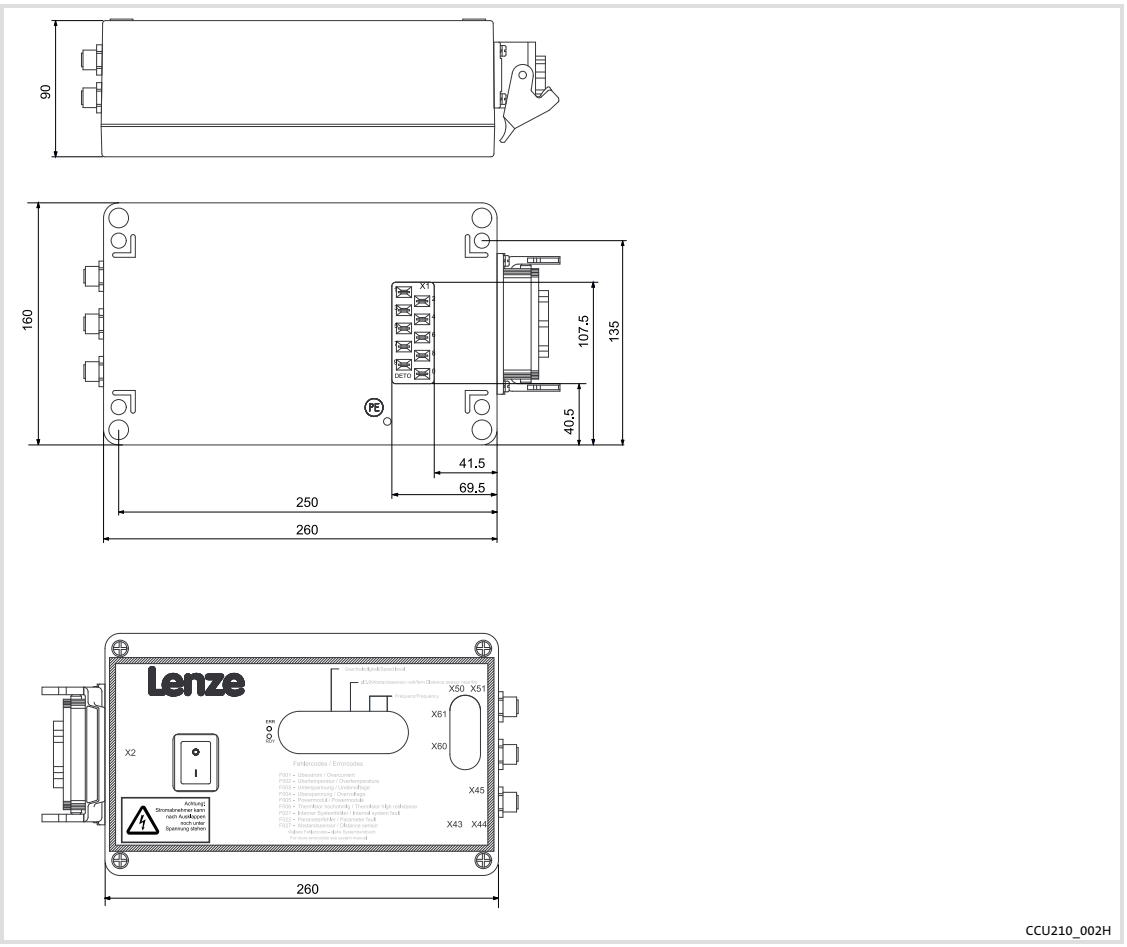
5 Mechanical installation

5.1 Important notes

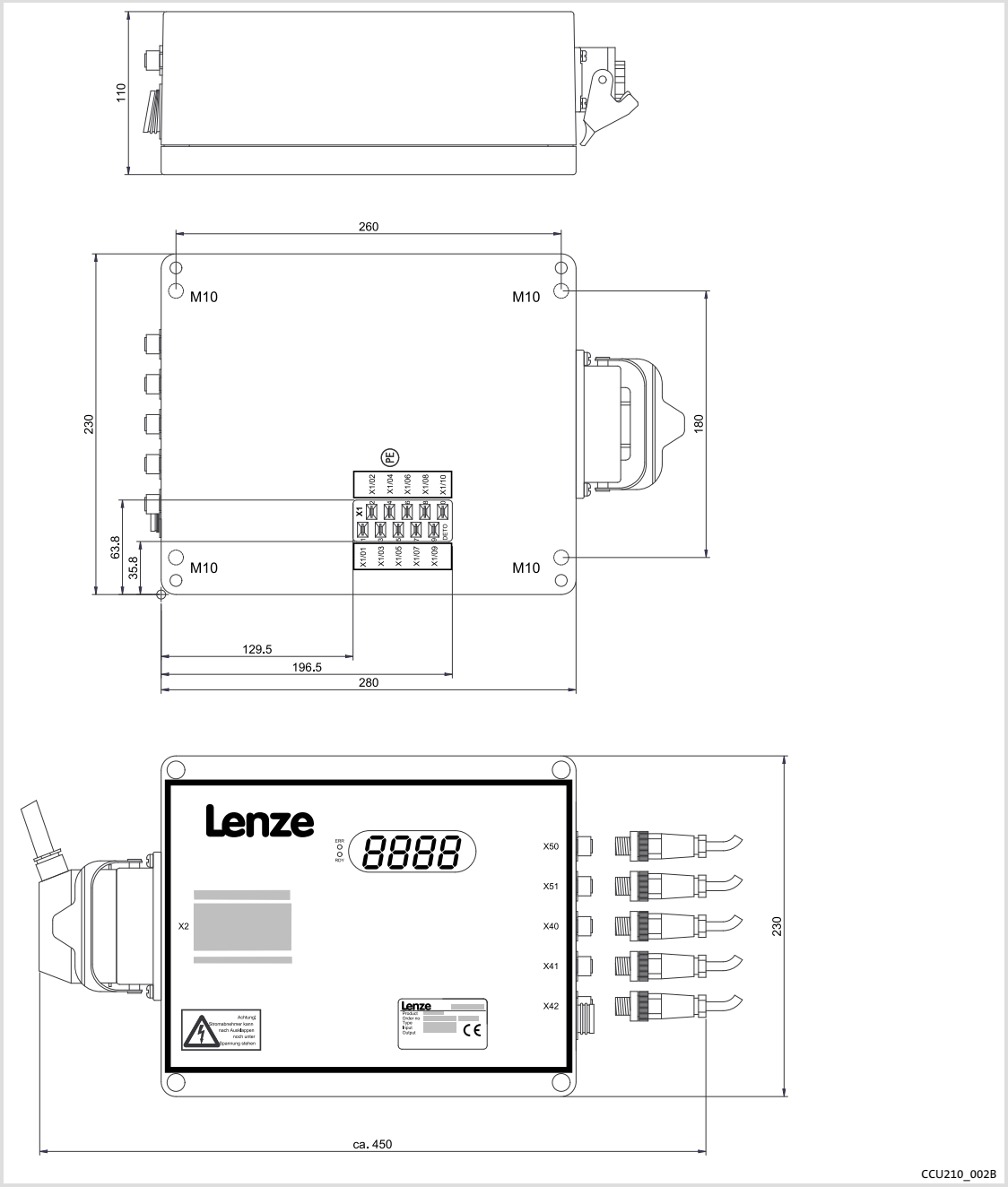
- Never install or commission damaged products. Please complain about damage immediately to the forwarder.
- Only mount the control system if the data on the nameplate of the control system correspond to the voltage mains.
- Ensure that the mounting location fulfils the following conditions:
  – The ambient conditions mentioned in the technical data have to be fulfilled.
  – No oils, acids, gases, vapours, radiation, etc.
  – Protection against the permeation of fluid.
  – Low-vibration and buckling resistant substructure.

5.2 Dimensions

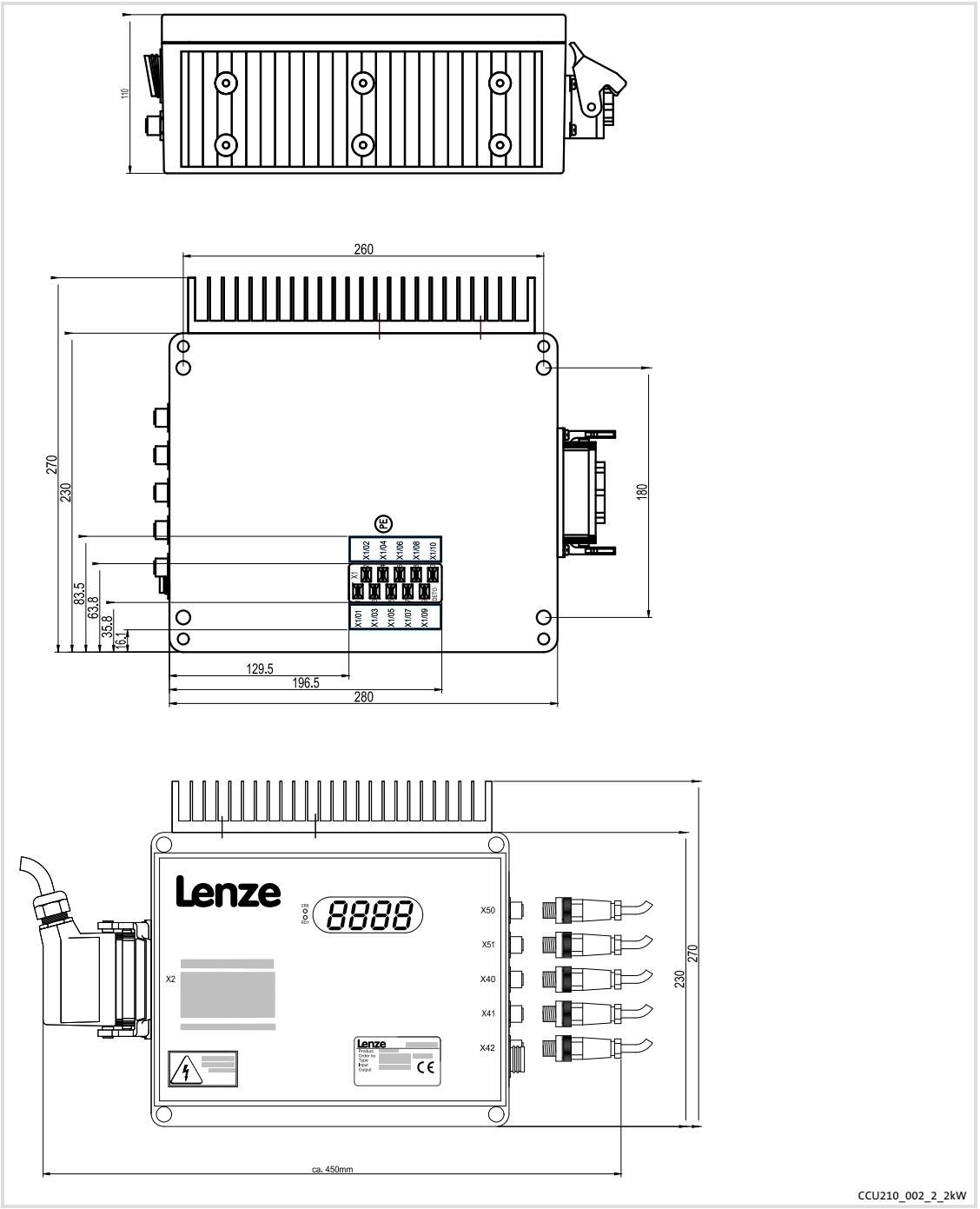
Power 0.75 kW



Power 1.5 kW


110
260
M10
M10
M10
M10
230
180
63.8
35.8
129.5
196.5
280
PE
X1
X101
X102
X103
X104
X105
X106
X107
X108
X109
X110
Lenze
8888
X2
X50
X51
X40
X41
X42
230
ca. 450
CCU210_002B

Power 2.2 kW


110
260
270
230
83.5
63.8
35.8
16.1
180
129.5
196.5
280
X1:
X1002
X1004
X1006
X1008
X1010
X1101
X1103
X1105
X1107
X1109
Lenze
8888
X2
X50
X51
X40
X41
X42
230
270
ca. 450mm
CCU210_002_2_2kW

6 Electrical installation

6.1 Important notes

Danger!

- The contacts for the **X1 and X2** power connectors can carry dangerous voltages when the control system is connected to the mains. Therefore deenergise the control system before working on it.
- After the connection of a PTC thermistor or a thermal switch (NC contact), all control terminals are only base-insulated (single isolating distance):
  - Protection against accidental contact in case the isolating distance is defective only is ensured by external measures, e. g. double insulation.
- The control system must be earthed via X1 to prevent injuries to persons and breakdown.

Note!

- **Supplied plastic covers on the connectors for the control connections and interfaces:**
  - Be absolutely sure to keep the plastic covers!
  - You must cover unused connections during transport, storage and operation with the plastic covers to guarantee the IP 54 enclosure.
- **Labels in the area of the control connections:**
  - Do not remove labels!
  - The IP 54 enclosure is only guaranteed with the label.

EMC-compliant wiring

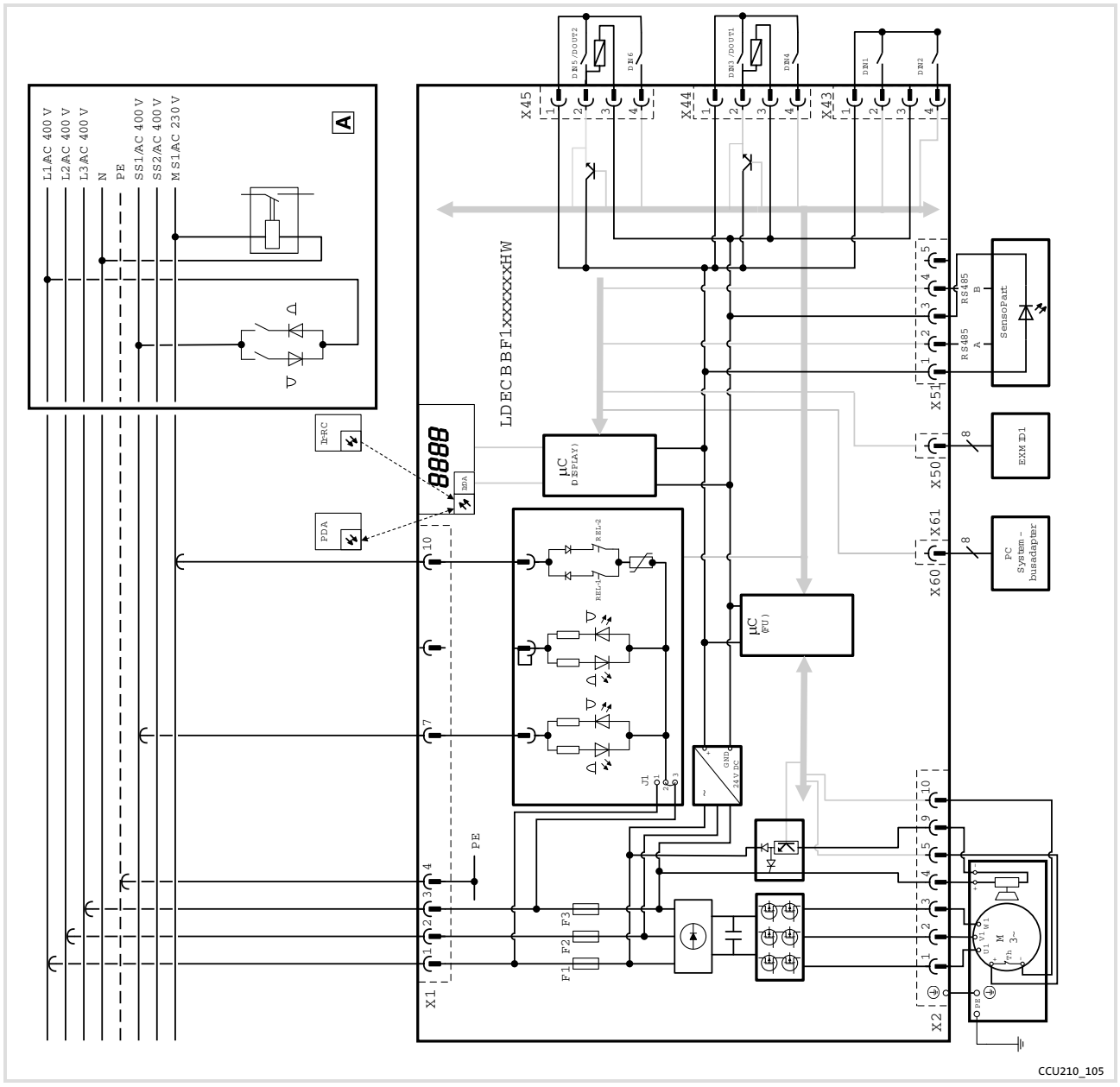
Note!

In order to ensure the trouble-free operation of Lenze control systems on monorail overhead conveyors, an EMC-compliant installation is requried. This includes the following:

- ► Conduct the motor cable as described in the technical data.
- ► Install the motor connection cables (connections U, V, W) separately from the sensor cables:
  - – Do not use a common cable duct.
  - – Do not lay the cables in parallel over longer distances.
  - – Minimum distance 10 cm.
  - – Keep the motor cable as short as possible.
- ► Lay the supply cables for the sliding contacts of the bars separately to the sensor cables:
  - – Do not use a common cable duct.
  - – Do not lay the cables over longer distances.
  - – Minimum distance 20 cm.
- ► Connect control and data cable shields at both ends.
- ► Prevent the formation of loops of the sensor cables when cables are too long:
  - – Conveniently trim the sensor cables or directly lay them in the wire harness by folding them up and interconnecting them using a cable tie, in order to avoid interferences and magnetic inductions.
- ► Earth the MOC vehicle directly via the earthing brushgear:
  - – Connect all movable parts to the cross beam or the main beam in a low-resistance manner.
  - – Use copper braid strap or drain wire 4 mm^2.
- ► Series connections of the earthing are allowed:
  - – If a movable part is earthed, the proximate movable part can be earthed on the previous movable part.
  - – For instance in the case of carriages, you can like this establish a closed and low-resistance connection from the cross beam to the main beam which the control is connected to, via several PE connections from the motor bracket, control beam, front and rear carriage.
- ► **The responsibility for the compliance with the EMC Directive in the machine application lies with the user.**

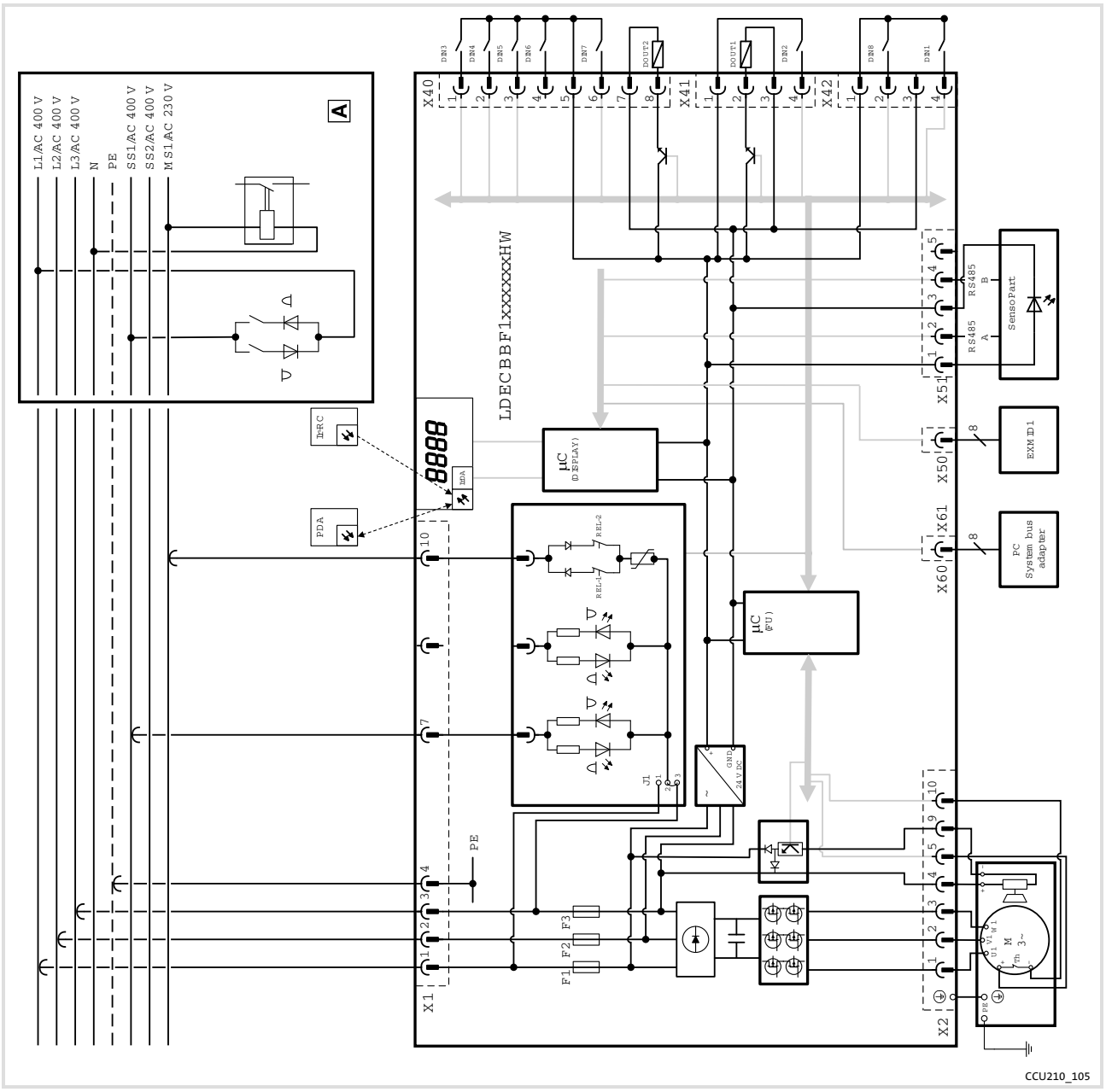
6.2 Basic circuit diagram

Power 0.75 kW



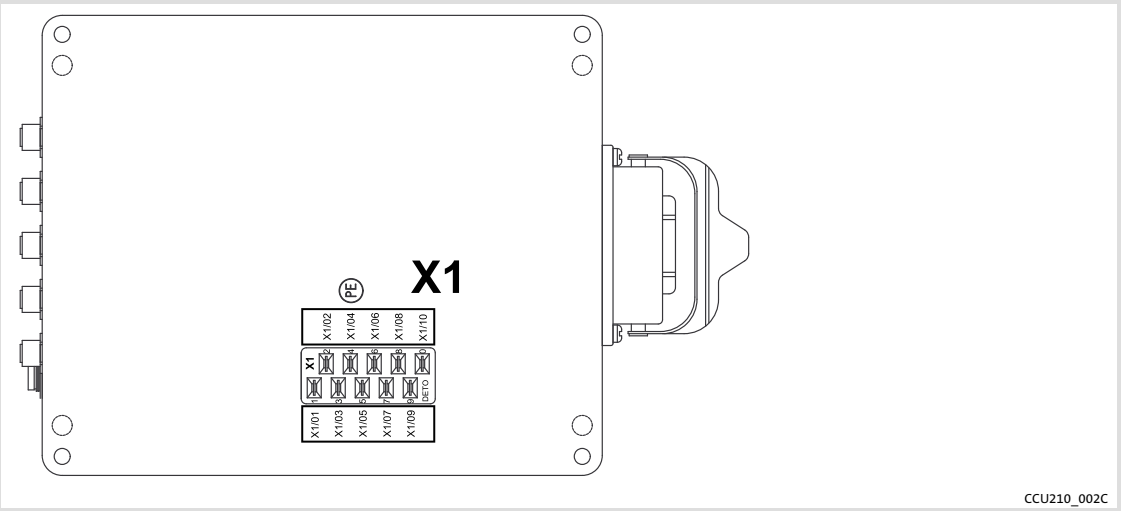
A Control cabinet

Power 1.5 kW and 2.2 kW



A Control cabinet

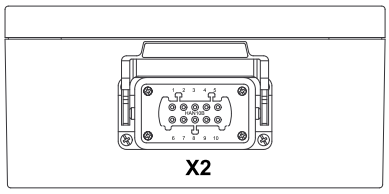
6.3 Mains connection



X1 - Mains connection			
Pin	**Connection**	**Description**	**Data**
			Connector: FASTON 6.3 x 0.8 mm flat connector, 10-pole
1	L1	Phase L1	3/PE/PEN AC 360 V - 0 % ... 528 V + 0 % 45 Hz - 0 % ... 65 Hz + 0 %
2	L2	Phase L2	
3	L3	Phase L3	
4 ⏚	PE	PE conductor	
5	n.c.	Not assigned	
6	n.c.	Not assigned	
7	SS1	Control bar 1	
8	n.c.	Not assigned	
9	n.c.	Not assigned	
10	MS1	Message bar 1	

The SS2 control bar is assigned according to customer's specifications. (see project documentation)

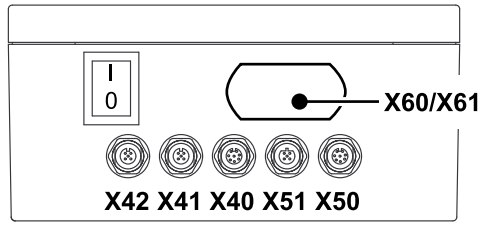
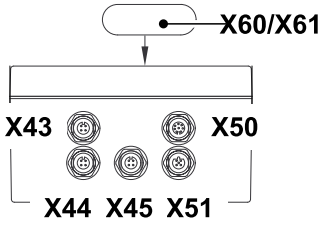
6.4 Motor connection



CCU210_002D

X2 - Motor connection			
Pin	**Connection**	**Description**	**Data**
			Connector: Socket, Harting HAN-10B
1	U	Phase U	
2	V	Phase V	
3	W	Phase W	
4	+ brake	Brake supply voltage	
5	+PTC	Motor temperature monitoring	PTC thermistor (PTC) or thermal contact (NC contact)
6	n.c.	Not assigned	
7	n.c.	Not assigned	
8	n.c.	Not assigned	
9	- brake	Brake supply voltage	
10	-PTC	Motor temperature monitoring	PTC thermistor (PTC) or thermal contact (NC contact)
⏚	PE	PE conductor	

6.5 Control terminals

Device in a power range of 1.5 kW and 2.2 kW	Devices in a power range of 0.75 kW
 CCU210_002E	 CCU_210_002G

Common control terminals

X50 - external data memory			
Pin	**Signal**	**Description**	**Data**
		EXMID1	Connector: socket, 8-pole, M12
		Connection of external data memory	Max. 2 kB Depending on the application

X51 – anti-collsion sensor for RS485 SensoPart forward travel			
Pin	**Signal**	**Description**	**Data**
			Connector: socket, 5-pole, M12, B-coded
1	+24V	Supply	
2	A	RS485 signal A	
3	GND	Reference potential	
4	B	RS485 signal B	
5	n. c.	Not assigned	
-	Shld	Shield	Applied to the connector housing

X60, X61 – CAN system bus connection			
Pin	**Signal**	**Description**	**Data**
		Two CAN system bus terminals for parameter setting and configuration	Connector: RJ45

Control terminals for devices in a power range of 1.5 kW and 2.2 kW

X40 - digital inputs DIN3 ... DIN7/digital output DOUT2			
Pin	**Signal**	**Description**	**Data**
			Connector: socket, 8-pole, M12
1	DIN3	Digital input 3	HIGH +16 .... +26.5 V DC
2	DIN4	Digital input 4	LOW 0 ... +4 V
3	DIN5	Digital input 5	4 mA Current per input for 24 V DC
4	DIN6	Digital input 6	max. 200 mA Permissible current loading per output **If inductive loads are switched, use a freewheeling diode as close to the inductive load as possible!**
5	+24V DC	Supply	
6	DIN7	Digital input 7	
7	GND	Reference potential	
8	DOUT2	Digital output 2	

X41 - digital input DIN2 / digital output DOUT1				
Pin	**Signal**	**Description**	**Data**	
			Connector: socket, 4-pole, M12	
1	+24V DC	Supply	HIGH	+16 .... +26.5 V DC
2	DOUT1	Digital output 1	LOW	0 ... +4 V
3	GND	Reference potential	4 mA	Current per input for 24 V DC
4	DIN2	Digital input 2	max. 200 mA	Permissible current loading per output **If inductive loads are being switched, freewheeling diodes are required. Place the diodes as close to the inductor load as possible!**

X42 - digital inputs DIN1/DIN8				
Pin	**Signal**	**Description**	**Data**	
			Connector: socket, 4-pole, M12	
1	+24V DC	Supply	HIGH	+16 .... +26.5 V DC
2	DIN8	Digital input 8	LOW	0 ... +4 V
3	GND	Reference potential	4 mA	Current per input for 24 V DC
4	DIN1	Digital input 1		

Control terminals for devices in a power range of 0.75 kW

X43 - digital inputs DIN1/DIN2				
Pin	**Signal**	**Description**	**Data**	
			Connector: socket, 4-pole, M12	
1	+24V DC	Supply	HIGH	+16 .... +26.5 V DC
2	DIN1	Digital input 1	LOW	0 ... +4 V
3	GND	Reference potential	4 mA	Current per input for 24 V DC
4	DIN2	Digital input 2		

X44 - digital inputs DIN3/DOUT1 - DIN4				
Pin	**Signal**	**Description**	**Data**	
			Connector: socket, 4-pole, M12	
1	+24V DC	Supply	HIGH	+16 .... +26.5 V DC
2[1)]	DIN3	Digital input 3	LOW	0 ... +4 V
	DOUT1	Digital output 1	4 mA	Current per input for 24 V DC
3	GND	Reference potential	max. 200 mA	Permissible current loading per output **If inductive loads are being switched, a spark suppressor must be used at the output!**
4	DIN4	Digital input 4		

1) DIN/DOUT cannot be used at the same time!

X45 - digital inputs DIN5/DOUT2 - DIN6				
Pin	**Signal**	**Description**	**Data**	
			Connector: socket, 4-pole, M12	
1	+24V DC	Supply	HIGH	+16 .... +26.5 V DC
2[1)]	DIN5	Digital input 5	LOW	0 ... +4 V
	DOUT2	Digital output 2	4 mA	Current per input for 24 V DC
3	GND	Reference potential	max. 200 mA	Permissible current loading per output **If inductive loads are being switched, a spark suppressor must be used at the output!**
4	DIN6	Digital input 6		

1) DIN/DOUT cannot be used at the same time!

6.6 Connection of system bus (CAN)

The CAN interface enables communication between a PC and a CCU210B control system.

The CAN system bus has the following functions:

- Exchange and change of parameter values
- Display of status messages

Before using the CAN interface ...

... install the following software components on your PC:

- the ”Global Drive Control” program

Tip!

The system requirements and the steps required for installing the program are described in the Global Drive Control or Global Drive Control easy user manuals.

- the device description file (*.pdb) provided by Lenze. The PC uses this file to identify the control system.
  - To ensure that you will not have to repeatedly look for the device description file, copy the **”82S8219V_10.pdb”** file into the PDB directory of the ”Global Drive Control” program, e.g. C:\Program Files\Lenze\GDC_4_100\PDB\049.

Connection to the PC

After installing the ”Global Drive Control” software program and the device description file, you can connect the device to your PC.

1. Remove the black cover on the control end of the device.

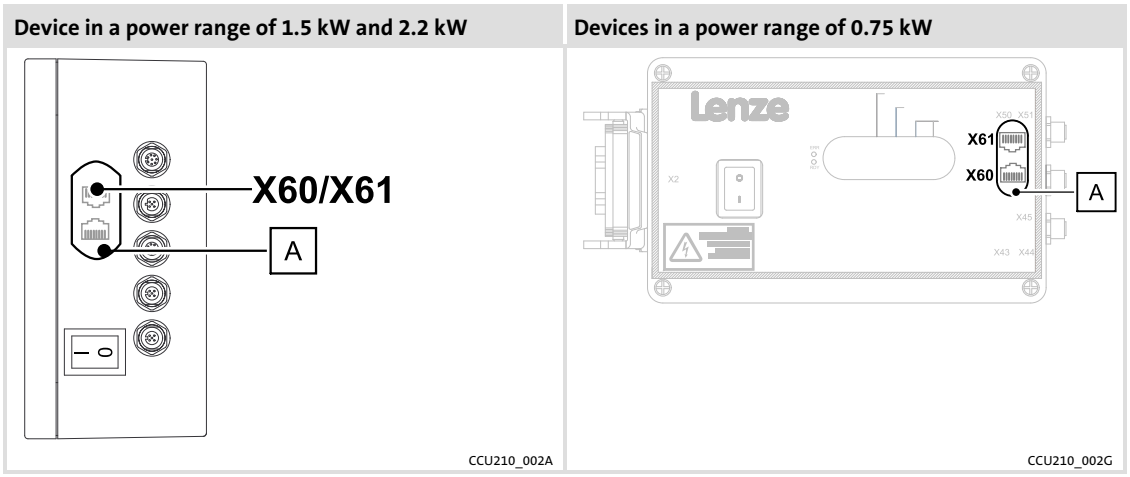


Fig. 6-1 Position of the RJ45 sockets for the CAN system bus

A	Cover
X60/X61	CAN system bus connections

2. Plug the cable into RJ45 socket X60 or X61.

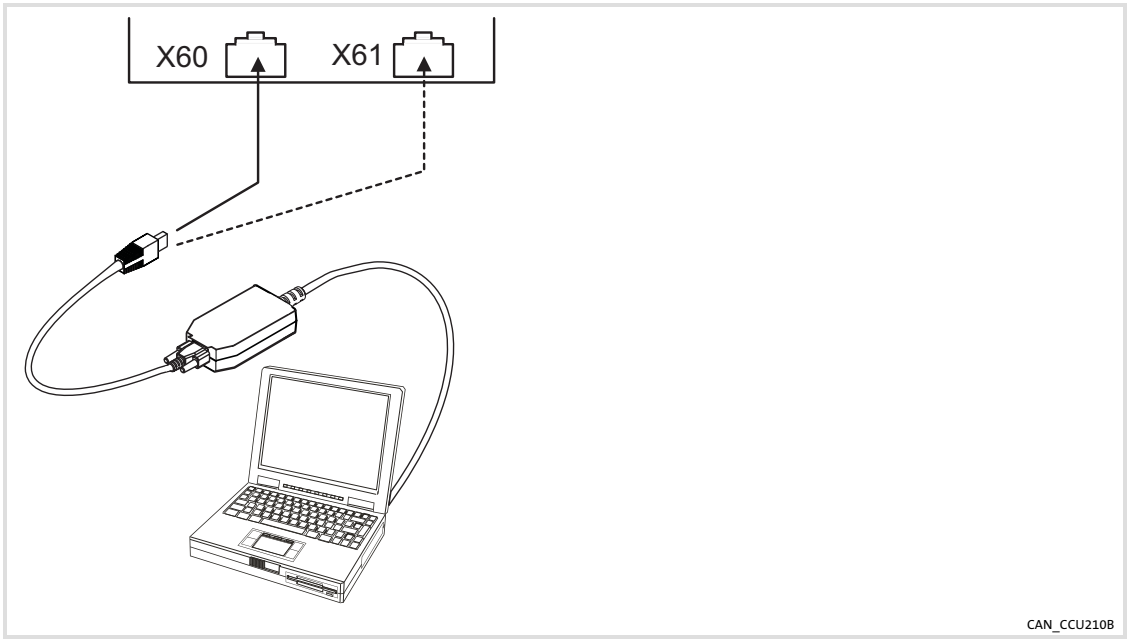


Fig. 6-2 Connecting the device to the PC using a system bus adapter

3. Connect the Sub-D interface of the cable with the system bus adapter.
4. Connect the system bus adapter to the PC.

7 Commissioning

7.1 Before switching on

Before initial switch-on, check ...

- ... whether the drive is undamaged.
- ... the entire wiring with regard to completeness, short circuit and earth fault.
- ... whether the mains and the motor are connected in correct phase relation.
- ... whether the control bars and message bars are connected in correct phase relation.
- ... whether the configuration saved is valid for the application.
- ... whether the parameters loaded are optimally adapted to the motor.

7.2 Switch-on sequence

Note!

- ► Disconnect the control system from the mains before you attach or remove the external EXMID1 data memory!
- ► If the external EXMID1 data memory is attached or removed during voltage is applied, the data saved on it can be damaged:
  – If data are damaged, the control system reports the error *F008*.
  – 📖 81

Note!

- ► Carefully follow the switch-on sequence described.
- ► In case of faults during commissioning, the chapter ”Troubleshooting and fault elimination” (📖 78) will help you.

How to switch on the control system:

1. If the control system is equipped with an external EXMID1 data memory:
   – Connect the external EXMID1 data memory to plug X50.
2. Switch on the mains:
   – After approx. 1 s the control system is ready for operation.
3. The control system behaves according to the specifications parameterised (signals on the digital inputs):

A The control system is ready for operation if the display shows the status display 00 or the current operating status.

B The control system is not ready for operation if the signal in the display is blinking:
   – A fault is active.
   – Eliminate the fault. (📖 78)

8 Function library

8.1 Important notes

Linking signals correctly

To operate the controller or to output status messages, you can freely link internal digital and analog signals to sources and targets.

You can avoid faults if you observe the following:

- Always select the source from the target:
  - Ask yourself, where the signal comes from.
  - Like this, you can easily find the correct entry for the corresponding code.
- A source can have several targets:
  - Thus, when a target is assigned to a source, undesirable or duplicate assignments that are mutually exclusive may occur.
  - Ensure that a source is only linked to the desired targets.
- A target can only have one source.

Code table and signal flow diagram as a quick overview

In the code table all functions are numerically listed in the form of a ”reference book” with short explanations. (📖 87 et seqq.)

The signal flow diagram shows in which way the most important codes are integrated in the internal signal processing. (📖 85)

8.2 Operating mode

The vehicle control system is operated in the ”V/f characteristic control” operating mode.

Codes for parameter setting

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0015	RW	EXT	4	0				Operating mode	📖 41
					0	V/f characteristic control			
					1	Reserved			
					2	Reserved			
C0016	RW	EXT	4	400				Mains voltage	📖 41
					0	{V}	480		
C0017	RW	EXT	4	0				Mains frequency	📖 41
					0	50 Hz			
					1	60 Hz			
C0018								Switching frequency of the inverter in ...	📖 41
1	RW	EXT	4	2		8 kHz		... Parameter set 1	
2				2		8 kHz		... Parameter set 2	
					Possible values				
					0	2 kHz			
					1	4 kHz			
					2	8 kHz			
C0024								V/f characteristic – U-boost voltage in ...	📖 41
1	RW	EXT	4	5.0	1	{%}	25.5	... Parameter set 1	
2				5.0				... Parameter set 2	
C0029								V/f characteristic – base frequency in ...	📖 41
1	RW	EXT	4	50.0	0	{Hz}	120.0	... Parameter set 1	
2				50.0				... Parameter set 2	

8.3 Digital input signals

8.3.1 Description

The vehicle control system is equipped with digital inputs and a control bar evaluation to evaluate digital input signals.

- Basic circuit diagram: (📖 29)
- You can assign different switch-on and switch-off delays (C0406/C0407) to each input signal.
- The input signals can be logically linked (C0409) and assigned to internal control functions via the assignment logic (C0410).

Digital inputs

There are 8 digital inputs to evaluate the sensors at the suspension gear of the monorail overhead conveyor.

Additionally you can logically invert each input.

Control bar

Digital input signals via the control bar serve as a command specification by the higher-level system control to the vehicle control system.

In the standard scope of supply the evaluation for a control bar is provided (SS1). On customer request, the evaluation for a second control bar (SS2) can be activated.

For each control bar you can use the digital signals ”positive half wave”, ”negative half wave” and ”full-wave” for function links.

Note!

The reference phase in the Lenze setting is L3.

On customer request, the reference phase L1 can be supplied by adapting the hardware.

Codes for parameter setting

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0406								Switch-on delay of digital input signals LOW ⇨ HIGH ...	📖 42
1	RW	EXT	4	0	0	{ms}	10000	... DIN1	
2				0				... DIN2	
3				0				... DIN3	
4				0				... DIN4	
5				0				... DIN5	
6				0				... DIN6	
7				0				... DIN7	
8				0				... DIN8	
9				0				... SS1 positive half wave	
10				0				... SS1 negative half wave	
11				0				... SS1 full-wave	
12				0				Reserved	
13				0				... SS2 positive half wave	
14				0				... SS2 negative half wave	
15				0				... SS2 full-wave	
16				0				Reserved	
C0407								Switch-off delay of digital input signals HIGH ⇨ LOW ...	📖 42
1	RW	EXT	4	0	0	{ms}	10000	... DIN1	
2				0				... DIN2	
3				0				... DIN3	
4				0				... DIN4	
5				0				... DIN5	
6				0				... DIN6	
7				0				... DIN7	
8				0				... DIN8	
9				0				... SS1 positive half wave	
10				0				... SS1 negative half wave	
11				0				... SS1 full-wave	
12				0				Reserved	
13				0				... SS2 positive half wave	
14				0				... SS2 negative half wave	
15				0				... SS2 full-wave	
16				0				Reserved	

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0408						Level inversion for digital inputs → inputs are LOW-active	📖 42
	RW	EXT	1	0	1 255		
					Possible values	Add values of the inverted inputs: e. g. DIN1, DIN3 and DIN5 are LOW-active → C0408 = 21.	
					0 No inversion		
					1 DIN1		
					2 DIN2		
					4 DIN3		
					8 DIN4		
					16 DIN5		
					32 DIN6		
					64 DIN7		
					128 DIN8		

8.3.2 Connection logic

By means of the connection logic (C0409) you can logically link digital inputs and control bar inputs to each other:

- The linkages 1-8 (C0409/1 ... C0409/8) are permanently set as ”OR” operations.
- The linkages 8-16 (C0409/8 ... C0409/16) are permanently set as ”AND” operations.
- For further function assignments the linkage results are provided as digital signal sources.

Codes for parameter setting

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0409						Logic operations of digital input signals Link ORx = OR operation Link ANDx = AND operation	📖 44
1	RW	EXT	2	0	0 65535	Link OR1	
2				0		Link OR2	
3				0		Link OR3	
4				0		Link OR4	
5				0		Link OR5	
6				0		Link OR6	
7				0		Link OR7	
8				0		Link OR8	
9				0		Link AND1	
10				0		Link AND2	
11				0		Link AND3	
12				0		Link AND4	
13				0		Link AND5	
14				0		Link AND6	
15				0		Link AND7	
16				0		Link AND8	
					Possible values	Add values of the digital input signals to define a linkage: e. g. DIN1, SS1 full-wave and SS2 full-wave are to be assigned to link OR2 (OR operation) → C0409/2 = 17409.	
					0 No linkage		
					1 DIN1		
					2 DIN2		
					4 DIN3		
					8 DIN4		
					16 DIN5		
					32 DIN6		
					64 DIN7		
					128 DIN8		
					256 SS1 positive half wave		
					512 SS1 negative half wave		
					1024 SS1 full-wave		
					2048 Reserved		
					4096 SS2 positive half wave		
					8192 SS2 negative half wave		
					16384 SS2 full-wave		
					31768 Reserved		

8.3.3 Assignment logic

In the assignment logic (C0410) you assign digital signal sources, like for instance digital inputs or linkage results, to the internal control functions. By this, you define the desired control functions and responses to specific events.

Codes for parameter setting

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0410							Linking digital input signals to an internal device function ...	📖 46
1	RW	EXT	4	0		Not assigned	... Motor V1 (incl. brake)	
2				0		Not assigned	... Motor V2 (incl. brake)	
3				0		Not assigned	... Motor V3 (incl. brake)	
4				0		Not assigned	... Motor V4 (incl. brake)	
5				0		Not assigned	... Motor V5 (incl. brake)	
6				0		Not assigned	... Motor V6 (incl. brake)	
7				0		Not assigned	... Motor V7 (incl. brake)	
8				0		Not assigned	... Motor V8 (incl. brake)	
9				0		Not assigned	... CW/CCW rotation of motor ● CW rotation = LOW ● CCW rotation = HIGH	
10				0		Not assigned	Reserved	
11				0		Not assigned	... Set fault	
12				0		Not assigned	...Acknowledge fault	
13				0		Not assigned	... Frequency inverter: change over parameter set ● Parameter set 1 = LOW ● Parameter set 2 = HIGH	
14				0		Not assigned	... DC-injection braking	
15				0		Not assigned	... Open brake	
16				0		Not assigned	... Stop1	
17				0		Not assigned	... Stop2	
18				0		Not assigned	... Stop3	
19				0		Not assigned	... Stop4	
20				0		Not assigned	... Frequency limitation 1	
21				0		Not assigned	... Frequency limitation 2	
22				0		Not assigned	... Frequency limitation 3	
23				0		Not assigned	... Frequency limitation 4	
24				0		Not assigned	... SensoPart: change over parameter set ● Parameter set 1 = LOW ● Parameter set 2 = HIGH	
25				0		Not assigned	... Deactivate control	

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0410						(Continuation) Linking digital input signals to an internal device function ...	📖 46
					Possible values		
					0 Not assigned		
					1 DIN1	Digital input DIN1	
					2 DIN2	Digital input DIN2	
					3 DIN3	Digital input DIN3	
					4 DIN4	Digital input DIN4	
					5 DIN5	Digital input DIN5	
					6 DIN6	Digital input DIN6	
					7 DIN7	Digital input DIN7	
					8 DIN8	Digital input DIN8	
					9 SS1 positive half wave	Control bar 1 positive half wave	
					10 SS1 negative half wave	Control bar 1 negative half wave	
					11 SS1 full-wave	Control bar 1 full-wave	
					12 Reserved		
					13 SS2 positive half wave	Control bar 2 positive half wave	
					14 SS2 negative half wave	Control bar 2 negative half wave	
					15 SS2 full-wave	Control bar 2 full-wave	
					16 Reserved		
					... ...		
					31 Reserved		
					32 Link OR1	Result of OR operation 1	
					33 Link OR2	Result of OR operation 2	
					34 Link OR3	Result of OR operation 3	
					35 Link OR4	Result of OR operation 4	
					36 Link OR5	Result of OR operation 5	
					37 Link OR6	Result of OR operation 6	
					38 Link OR7	Result of OR operation 7	
					39 Link OR8	Result of OR operation 8	
					40 Link AND1	Result of AND operation 1	
					41 Link AND2	Result of AND operation 2	
					42 Link AND3	Result of AND operation 3	
					43 Link AND4	Result of AND operation 4	
					44 Link AND5	Result of AND operation 5	
					45 Link AND6	Result of AND operation 6	
					46 Link AND7	Result of AND operation 7	
					47 Link AND8	Result of AND operation 8	
					48 Reserved		
					... ...		
					63 Reserved		

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0410						(Continuation) Linking digital input signals to an internal device function	📖 46
					64 HWC match code 1	HWC match code 1	
					65 HWC match code 2	HWC match code 2	
					66 HWC match code 3	HWC match code 3	
					67 HWC match code 4	HWC match code 4	
					68 HWC match code 5	HWC match code 5	
					69 HWC match code 6	HWC match code 6	
					70 HWC match code 7	HWC match code 7	
					71 HWC match code 8	HWC match code 8	
					72 HWC match code 9	HWC match code 9	
					73 HWC match code 10	HWC match code 10	
					74 HWC match code 11	HWC match code 11	
					75 HWC match code 12	HWC match code 12	
					76 HWC match code 13	HWC match code 13	
					77 HWC match code 14	HWC match code 14	
					78 HWC match code 15	HWC match code 15	
					79 HWC match code 16	HWC match code 16	
					80 Reserved		
					... ...		
					95 Reserved		
					96 HWC-OR1	Result of HWC OR operation	
					97 HWC-OR2	Result of HWC OR operation	
					98 HWC-OR3	Result of HWC OR operation	
					99 HWC-OR4	Result of HWC OR operation	
					100 HWC-OR5	Result of HWC OR operation	
					101 HWC-OR6	Result of HWC OR operation	
					102 HWC-OR7	Result of HWC OR operation	
					103 HWC-OR8	Result of HWC OR operation	
					104 Reserved		
					... ...		
					252 Reserved		
					253 Fixed LOW	Signal level always is LOW	
					254 Fixed HIGH	Signal level always is HIGH	
					255 Not assigned		

8.4 Digital output signals

8.4.1 Description

The vehicle control system is equipped with digital outputs and a message bar output to provide digital output signals.

- Basic circuit diagram: (📖 29)
- The internal status signals are assigned to the output signals via the assignment logic (C0415).

Digital outputs

There are 2 digital outputs to control the actor technology at the suspension gear of the monorail overhead conveyor.

Additionally you can logically invert each output.

Message bar

The digital output signals via the message bar serve as a feedback from the vehicle control system to the higher-level system control.

A message bar output (MS1) is provided.

You can output the digital signals ”positive half wave” and ”negative half wave”.

Note!

The reference phase in the Lenze setting is L3.

On customer request, the reference phase L1 can be supplied by adapting the hardware.

Codes for parameter setting

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0416							Level inversion for digital outputs → outputs are LOW-active	📖 49
	RW	EXT	1	0	1	255		
					Possible values		Add values of the inverted outputs: e. g. DOUT1 and message bar1 negative half wave are LOW-active → C0416 = 33.	
					0	No inversion		
					1	DOUT1		
					2	DOUT2		
					4	Reserved		
					8	Reserved		
					16	Message bar1 positive half wave		
					32	Message bar1 negative half wave		
					64	Reserved		
					128	Reserved		

8.4.2 Assignment logic

In the assignment logic (C0415) you assign internal status signals to the message bar and the digital outputs.

Codes for parameter setting

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0415							Linking internal status signals to digital output signal ...	📖 50
1	RW	EXT	4	0		Not assigned	...Digital output DOUT1	
2				0		Not assigned	...Digital output DOUT2	
3				0		Not assigned	Reserved	
4				0		Not assigned	Reserved	
5				0		Not assigned	... Message bar1 positive half wave	
6				0		Not assigned	... Message bar1 negative half wave	
					Possible values			
					0	Not assigned		
					1	Motor V1 active		
					2	Motor V2 active		
					3	Motor V3 active		
					4	Motor V4 active		
					5	Motor V5 active		
					6	Motor V6 active		
					7	Motor V7 active		
					8	Motor V8 active		
					9	Motor CCW rotation active		
					10	Reserved		
					11	Fault active		
					12	Reserved		
					13	Frequency inverter: parameter set 2 active		
					14	Reserved		
					15	Brake is open		
					16	Stop 1 active		
					17	Stop 2 active		
					18	Stop 3 active		
					19	Stop 4 active		
					20	Frequency limitation 1 active		
					21	Frequency limitation 2 active		
					22	Frequency limitation 3 active		
					23	Frequency limitation 4 active		
					24	SensoPart: parameter set 2 active		
					25	Reserved		
					...	...		
					29	Reserved		
					30	HWC code range active		
					31	Reserved		

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0415						(Continuation) Linking internal status signals to digital output signal ...	🕮 50
					Possible values		
					32 Motor is running		
					33 Reserved		
					34 Status On/Off: OFF active		
					35 Status On/Off: OFF active or fault active		
					36 Status On/Off: OFF active or fault active or Stop 1 active or manual Ir operation active		
					37 Reserved		
					38 Stop 1, 2, 3, 4 active or SensoPart active		
					39 Frequency limitation 1, 2, 3, 4 active or SensoPart active		
					40 Reserved		
					41 Reserved		
					42 SensoPart: Stop active		
					43 SensoPart: frequency limitation active		
					44 Reserved		
					... ...		
					50 Reserved		
					51 Start-up warning or fault active		
					52 Reserved		
					... ...		
					59 Reserved		
					60 IrDA positioning active		
					61 IrDA position reached		
					62 Reserved		
					... ...		
					252 Reserved		
					253 Fixed LOW	Signal level always is LOW	
					254 Fixed HIGH	Signal level always is HIGH	
					255 Not assigned		

8.5 Motor control

8.5.1 ”Motor speed V1-V8” function

By the ”Motor speed V1-V8” functions (C0410/1 ... C0410/8), 8 speed values for each parameter set are provided.

- The functions are activated via digital signal sources (e. g. digital inputs).
  - The brake opens automatically.
  - The motor is activated with the frequency (C0011/1 ... C0011/8) that is parameterised respectively.
  - If two speeds are activated at the same time, the higher stage has priority. Example: If V2 and V5 are activated at the same time, V5 is used.
- If a ”Stop function” is active, the ”Motor speed V1-V8” function is inhibited. The motor control is stopped. The motor is braked to V0 via the deceleration ramp of the stop function (C0434/1 ... C0434/4).
- If the ”Frequency limitation” function is active, the ”Motor speed V1-V8” function is interrupted. The motor is controlled with the corresponding frequency (C0440/1 ... C440/4).

The acceleration and deceleration times for V1-V8 can be set individually for each drive frequency (C0012/1 ... C0012/8 and C0013/1 ... C0013/8). The direction of rotation is controlled via C0410/9. A second parameter set can be activated via C0410/13.

Codes for parameter setting

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0010	RW	EXT	4	10000				Conversion factor: speed at 50 Hz drive frequency	📖 52
					0	{mm/min}	65535		
C0011								Drive frequency for ...	📖 52
1	RW	EXT	4	0.0	0.0	{Hz}	120.0	... V1	
2				0.0				... V2	
3				0.0				... V3	
4				0.0				... V4	
5				0.0				... V5	
6				0.0				... V6	
7				0.0				... V7	
8				0.0				... V8	
C0012								Acceleration time for ...	📖 52
1	RW	EXT	4	50	1	{Hz/s}	255	... V1	
2				50				... V2	
3				50				... V3	
4				50				... V4	
5				50				... V5	
6				50				... V6	
7				50				... V7	
8				50				... V8	

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0013								Deceleration time for ...	📖 52
1	RW	EXT	4	50	1	{Hz/s}	255	... V1	
2				50				... V2	
3				50				... V3	
4				50				... V4	
5				50				... V5	
6				50				... V6	
7				50				... V7	
8				50				... V8	
C0014	RW	EXT	4	80				Deceleration time for quick stop functions: ● On/Off switch ● Error ● SensoPart trip-out	📖 52
					1	{Hz/s}	255		
C0420	RW	EXT	4	0				Deceleration time: start-up after mains connection V0 ⇨ Vx	📖 52
					0	{ms}	20000		
C0421	RW	EXT	4	0				Deceleration time: start-up after On/Off switch to ON V0 ⇨ Vx	📖 52
					0	{ms}	20000		

8.5.2 Stop functions

In order to interrupt the main functions ”Motor V1-V8”, you can use ”Stop functions”. For this purpose, four independent functions are provided (C0410/16 ... C0410/19):

- The functions are activated via digital signal sources (e. g. digital inputs).
- For the deceleration of Vx to V0 separate deceleration ramps (C0434/1 ... C0434/4) are provided.
- For each function you can set deceleration times for the acceleration ramps (C0432/1 ... C0432/4) and deceleration ramps (C0433/1 ... C0433/4).
- You can set each function so that the stop function only is activated in the case of one direction of rotation of the drive.

Codes for parameter setting

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0430								Configuration of function ...	📖 54
1	RW	EXT	4	3				... Stop 1	
2				3				... Stop 2	
3				3				... Stop 3	
4				3				... Stop 4	
					Possible values				
					1	Stop x only active in the case of CW rotation			
					2	Stop x only active in the case of CCW rotation			
					3	Stop x active in the case of CW and CCW rotation			
C0432								delay time: start-up V0 ⇨ Vx after ...	📖 54
1	RW	EXT	4	0	0	{ms}	20000	... Stop 1	
2				0				... Stop 2	
3				0				... Stop 3	
4				0				... Stop 4	
C0433								delay time: start of deceleration ramp Vx ⇨ V0 after command ...	📖 54
1	RW	EXT	4	0	0	{ms}	20000	... Stop 1	
2				0				... Stop 2	
3				0				... Stop 3	
4				0				... Stop 4	
C0434								Deceleration ramp Vx ⇨ V0 for ...	📖 54
1	RW	EXT	4	50	1	{Hz/s}	255	... Stop 1	
2				50				... Stop 2	
3				50				... Stop 3	
4				50				... Stop 4	

8.5.3 ”Frequency limitation” function (speed limit)

In order to interrupt the main functions ”Motor V1-V8”, the ”Frequency limitation” function can be used. If the function is active, it limits the drive frequency to the maximum value that is respectively set (C0441/1 ... C0441/4). For this purpose, four independent functions are provided (C0410/20 ... C0410/23):

- The functions are activated via digital signal sources (e. g. digital inputs).
- For the deceleration of Vx to the limited speed VLx there are separate deceleration ramps (C0444/1 ... C0444/4).
- For each function you can set deceleration times for the acceleration ramps (C0442/1 ... C0442/4) and deceleration ramps (C0443/1 ... C0443/4).
- You can set each function so that the frequency limitation only is activated in the case of one direction of rotation of the drive.

Codes for parameter setting

Code				Possible settings				Description	
No.	⇧⇩	💾	Byte	Lenze	Selection				
C0440								Configuration of function ...	📖 55
1	RW	EXT	4	3				... Frequency limitation 1	
2				3				... Frequency limitation 2	
3				3				... Frequency limitation 3	
4				3				... Frequency limitation 4	
					Possible values				
					1	Frequency limitation only active in the case of CW rotation			
					2	Frequency limitation only active in the case of CCW rotation			
					3	Frequency limitation active in the case of CW and CCW rotation			
C0441								Drive frequency for ...	📖 55
1	RW	EXT	4	0	0	{Hz}	120.0	... Frequency limitation 1 (VL1)	
2				0				... Frequency limitation 2 (VL2)	
3				0				... Frequency limitation 3 (VL3)	
4				0				... Frequency limitation 4 (VL4)	
C0442								delay time: acceleration VLx ⇨Vx after deactivation of ...	📖 55
1	RW	EXT	4	0	0	{ms}	20000	... Frequency limitation 1	
2				0				... Frequency limitation 2	
3				0				... Frequency limitation 3	
4				0				... Frequency limitation 4	
C0443								delay time: start of deceleration ramp Vx ⇨ VLx after command ...	📖 55
1	RW	EXT	4	0	0	{ms}	20000	... Frequency limitation 1	
2				0				... Frequency limitation 2	
3				0				... Frequency limitation 3	
4				0				... Frequency limitation 4	

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0444								Deceleration ramp Vx ⇨ VLx for ...	📖 55
1	RW	EXT	4	50	1	{Hz/s}	255	... Frequency limitation 1	
2				50				... Frequency limitation 2	
3				50				... Frequency limitation 3	
4				50				... Frequency limitation 4	

8.5.4 ”Open brake” function

You can also open the motor brake via digital signal sources (C0410/15) without using the ”Motor V1-V8” functions.

In order to prevent an overload of the brake by triggering it for too long, a maximum triggering time can be parameterised via C0451. After this time has elapsed, the brake automatically engages even if a trigger signal is available.

If the ”Motor V1-V8” functions are active, the motor brake always is open automatically.

Codes for parameter setting

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0450	RW	EXT	4	0				”Open brake” function: configuration	📖 56
					0	Brake opens immediately		Brake opens if C0410/15 = HIGH	
					1	Brake opens with delay		Brake opens if C0410/15 = HIGH and drive frequency = 0 Hz	
C0451	RW	EXT	4	0				”Open brake” function: maximum activation time	📖 56
					0	{s}	1000	● C0451 = 0 s: – Brake opens if C0410/15 = HIGH – Brake closes if C0410/15 = LOW ● C0451 > 0 s: – Brake opens if C0410/15 = HIGH – Brake closes after the time set if C0410/15 = HIGH	

8.6 Monitoring

8.6.1 Anti-collision sensor SensoPart

The SensoPart permanently measures the distance to a reflector on the vehicle ahead. The distance is read out via a serial interface RS485 by the vehicle control system and is evaluated according to the function parameterised.

Via a digital signal source (digital inputs, linkage result, etc…) you can switch over between two SensoPart parameter sets (close-up range and long range, e. g. loaded or empty vehicle).

For each parameter set, 2 distances, including hystereses in [mm], can be parameterised. When an object is detected within the approach distance [mm] (speed limit), the speed is limited to a freely parameterisable threshold [Hz].

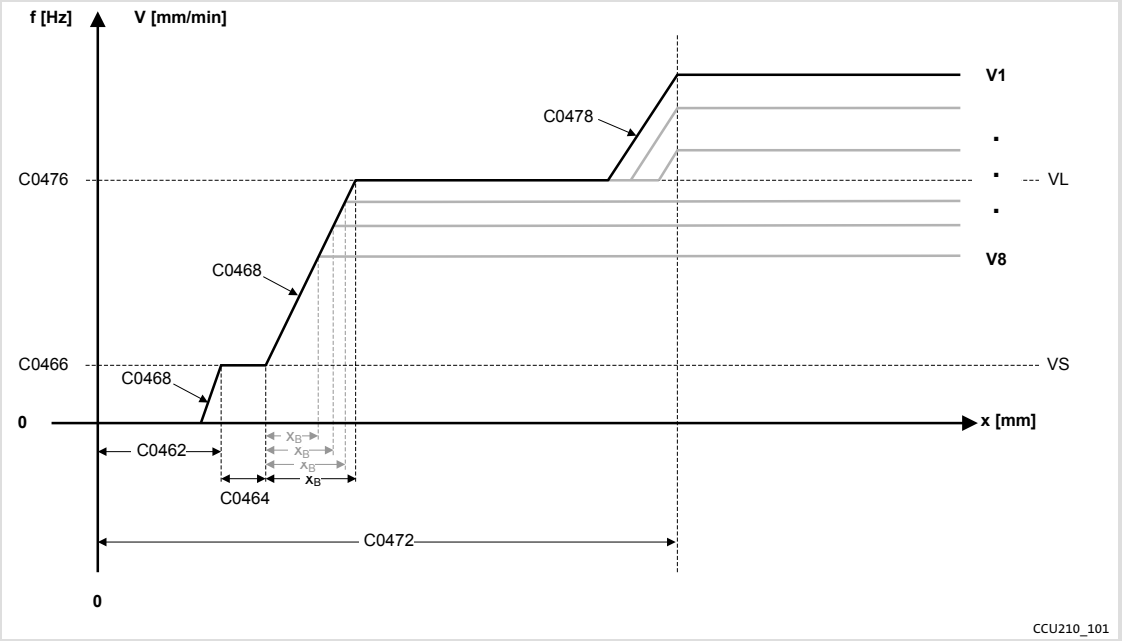
The required braking distance towards the vehicle ahead, calculated via the speed [Hz] that is currently travelled and the deceleration set [Hz/s], is added to the stopping distance [mm]. Furthermore a parameterisable offset [mm] is added to this value. If the calculated minimum braking distance to the vehicle ahead is reached, the control system starts to brake on the parameterisable creeping speed [Hz]. When the parameterised stopping distance [mm] is reached, a stop takes place. Only if the distance to the vehicle ahead is increased via the minimum distance+hysteresis, a possibly parameterised start-up delay time is awaited and the vehicle accelerates to the approach speed again. If the approach distance+hysteresis are exceeded, the vehicle is accelerated to the travelling speed specified.

The ”trip-out switching threshold” parameter (C0461) is used to stop the vehicle as quickly as possible when the set value falls short if the alignment between reflector and SensoPart (e.g. in curves) is poor.

Note!

If no SensoPart is used, you have to deactivate the function in C0460!

Mode of operation



x_B Braking distance for braking to creeping speed, calculated for the respective speed

Step monitoring

For the SensoPart, a step monitoring function can be activated via parameter. The step monitoring function is only active if the vehicle, while a travel command is pending, has stopped and is at standstill due to the distance to the SensoPart sensor.

The step monitoring function is not active during travelling or if the vehicle is at standstill due to a switched-off travel command.

If the control in the buffered state detects a step in the distance of the SensoPart sensor, for a parameterisable time a warning signal is only shown on the display. After the time has elapsed, this warning signal changes to a fault signal.

The warning signal and also the fault signal will delete automatically when the SensoPart sensor detects a correct distance value again (i. e. when it can "see" the mirror of the vehicle in front again).

The fault signal must be acknowledged manually at the control if the SensoPart sensor can no longer detect a distance to the vehicle in front (for instance, because the vehicle in front has moved in the meantime).

After the step monitoring function has responded, the vehicle will start as usual if ...

- the SensoPart sensor reports a correct distance which has exceeded the stop distance parameterised (plus hysteresis) (i.e. "sees" a mirror).
- the fault signal on the vehicle has been acknowledged manually and the SensoPart sensor does not detect a mirror in front. PLEASE NOTE: This may also occur if the fault signal is acknowledged while a person is standing in front of the vehicle.

The "Step monitoring function activated" status (i. e. distance has changed abruptly and this state is still pending) is saved non-volatilely. If the SensoPart sensor still does not detect a mirror after mains on/off, the warning signal and then the fault signal is output again.

Codes for parameter setting

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0128	RW	EXT	4	1			Configuration of SensoPart error monitoring	📖 57
					0	Off		
					1	Error		
					2	Warning		
C0261	RW	EXT	2	1000			Encoder constant	📖 70
					50	{inc/m} 5000		
C0460	RW	EXT	4	1			SensoPart: configuration	📖 57
					0	SensoPart inactive		
					1	SensoPart active - 57.6 kBaud		
					2	SensoPart active - 62.5 kBaud		
					3	SensoPart active - 38.4 kBaud		
					4	SensoPart active - 19.2 kBaud		
					5	SensoPart active - 9.6 kBaud		
					6	SensoPart active - 4.8 kBaud		

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0461	RW	EXT	4	500				SensoPart: distance for quick disconnection	📖 57
					0	{mm}	65535		
C0462								SensoPart: stop distance in ...	📖 57
1	RW	EXT	4	2000	0	{mm}	65535	... Parameter set 1	
2				2000				... Parameter set 2	
C0463								SensoPart: hysteresis for stop distance in ...	📖 57
1	RW	EXT	4	100	0	{mm}	65535	... Parameter set 1	
2				100				... Parameter set 2	
C0464								SensoPart: traverse path with creeping speed VS in ...	📖 57
1	RW	EXT	4	50	0	{mm}	65535	... Parameter set 1	
2				50				... Parameter set 2	
C0466								SensoPart: drive frequency for creeping speed VS in ...	📖 57
1	RW	EXT	4	5.0	0	{Hz}	120.0	... Parameter set 1	
2				5.0				... Parameter set 2	
C0467								SensoPart: delay time: start of the acceleration V0 ⇨ VS in ...	📖 57
1	RW	EXT	4	1000	0	{ms}	20000	... Parameter set 1	
2				1000				... Parameter set 2	
C0468								SensoPart: deceleration ramp for stop VS ⇨ V0 in ...	📖 57
1	RW	EXT	4	50	1	{Hz/s}	255	... Parameter set 1	
2				50				... Parameter set 2	
C0469	RW	EXT	1	0				SensoPart step monitoring:	📖 57
					0	Step monitoring inactive			
					1	Step monitoring active			
C0470	RW	EXT	1	10				SensoPart step monitoring:	📖 57
					2	{s}	20	Error delay	
C0472								SensoPart: distance for switch-over to approach speed ...	📖 57
1	RW	EXT	4	4000	0	{mm}	65535	... Parameter set 1	
2				4000				... Parameter set 2	
C0473								SensoPart: hysteresis for short distance in ...	📖 57
1	RW	EXT	4	100	0	{mm}	65535	... Parameter set 1	
2				100				... Parameter set 2	
C0476								SensoPart: drive frequency for approach speed in ...	📖 57
1	RW	EXT	4	20.0	0	{Hz}	120.0	... Parameter set 1	
2				20.0				... Parameter set 2	

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0478								SensoPart: deceleration ramp Vx ⇨ VLx for frequency limitation distance in ...	📖 57
1	RW	EXT	4	50	1	{Hz/s}	255	... Parameter set 1	
2				50				... Parameter set 2	
C0610	R		4					SensoPart: current distance	📖 57
					0	{mm}	65535		

8.6.2 I²t monitoring

By means of the I²xt monitoring, the motor utilisation is monitored. The monitoring simulates a motor protection switch.

How to configure the motor protection switch:

- ► Enter the rated motor current in C0022.
- ► Enter the tripping class in C0121.
- ► Define the response in the case of overload in C0122.

Stop!

Possible overheating of the motor

The I²xt monitoring does not present a full motor protection, as the motor temperature calculated is reset every time the mains is switched off.

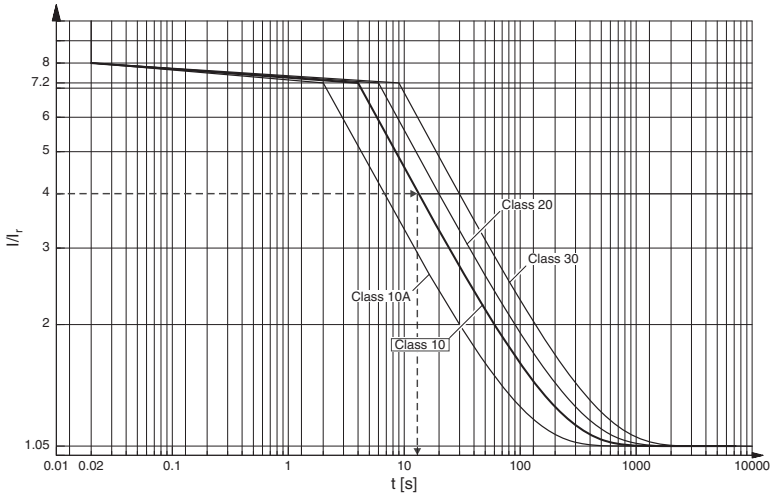
Possible consequences:

- ► The connected motor can be overheated when the mains is switched on again if ...
  - – ... the motor already is strongly heated and is continued to be overloaded.
  - – ... the cooling air supply is interrupted.
  - – ... the cooling air is too warm.

Protective measures:

- ► Provide for a full motor protection that is additionally equipped with a PTC thermistor or a thermal contact in the motor.
- ► The PTC thermistor or thermal contact has to be wired and connected correctly.

I²t tripping characteristic



Class 10A Class 10 (delivery status) Class 20 Class 30	Tripping classes according to DIN EN 60947-4-2
I	Output current
I_r	Rated motor current

Example

(dashed line in the diagram)

If class 10 is set, the error message set is activated if output current I has the fourfold amount of the rated motor current I_r set for approx. 13 s.

Codes for parameter setting

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0022								Rated motor current in ...	📖 61
1	RW	EXT	4	1.0	0	{A}	20.0	... Parameter set 1	
2				1.0				... Parameter set 2	
C0121	RW	EXT	4	2				Tripping class for I²xt monitoring	📖 61
					1	Tripping class CLASS 10A			
					2	Tripping class CLASS 10			
					3	Tripping class CLASS 20			
					4	Tripping class CLASS 30			
C0122	RW	EXT	4	1				Configuration of I²xt monitoring	📖 61
					0	Off			
					1	Error			
					2	Warning			

8.6.3 Non-equivalence monitoring

By the non-equivalence monitoring you check two digital inputs each with regard to an unequal input level. If the input level is the same for both digital inputs, an error is reported.

For non-equivalence monitoring, sensors with a normally open contact (no) and a normally closed contact (nc) are suitable. Both contacts have to be switched at the same time.

There are four non-equivalence monitoring functions, which can be set via C0402. Each monitoring function can exactly check two digital inputs with regard to each other.

In C0403 you set the error deceleration times.

Codes for parameter setting

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0401				0				Configuration: response of the non-equivalence monitoring at the digital inputs	📖 63
1	RW	EXT	1	0	0		255	Non-equivalence monitoring 1	
2				0				Non-equivalence monitoring 2	
3				0				Non-equivalence monitoring 3	
4				0				Non-equivalence monitoring 4	
					Possible values				
					0	Error in the case of unequal levels at DINx			
					1	Error in the case of equal levels at DINx			
C0402								Configuration of non-equivalence monitoring of the digital inputs	📖 63
1	RW	EXT	1	0	0		255	Non-equivalence monitoring 1	
2				0				Non-equivalence monitoring 2	
3				0				Non-equivalence monitoring 3	
4				0				Non-equivalence monitoring 4	
					Possible values			For the non-equivalence monitoring only two digital inputs can be used each. Add values of the inputs monitored and enter in C0402/x: e. g. non-equivalence monitoring for DIN3 and DIN5 = 20.	
					0	No monitoring			
					1	DIN1			
					2	DIN2			
					4	DIN3			
					8	DIN4			
					16	DIN5			
					32	DIN6			
					64	DIN7			
					128	DIN8			
C0403								Deceleration of non-equivalence detection	📖 63
1	RW	EXT	4	0	0	{ms}	10000	Deceleration for C0402/1	
2				0				Deceleration for C0402/2	
3				0				Deceleration for C0402/3	
4				0				Deceleration for C0402/4	

8.6.4 Motor temperature monitoring

The motor temperature either is monitored via a PTC inside the motor or via a thermal contact. The response of the motor temperature monitoring (Error, Warning, Off) can be defined via C0120.

Codes for parameter setting

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0120	RW	EXT	4	1		Configuration of motor temperature monitoring	📖 64
					0 Off		
					1 Error		
					2 Warning		

8.6.5 Output stage temperature monitoring

If the output stage temperature is > 100 °C for 3 seconds, an error message is output. You can only acknowledge the message if the output stage temperature has been < 90 °C for 5 seconds. The current output stage temperature can be read in C0056.

8.6.6 Parameter error

After power-on, all parameter data are read out from the flash memory and/or from the external data connector. Then a checksum verification is carried out. A parameter error is triggered if the checksum saved does not correspond to the checksum calculated or if a new software version with a changed parameter repository has been loaded.

How to eliminate a parameter error:

1. Set all parameters to the Lenze setting (C0002 = 1).
2. Transfer the valid parameter set for the respective application again.
3. Wait until the *PAr* display goes out.
4. Switch off the supply voltage and then switch it on again.

Note!

During the download of the parameters via PC or PDA, never switch off the supply voltage as long as *PAr* is displayed in the 7-segment display!

Otherwise the transfer of the parameters is incomplete.

8.6.7 External error

The tripping of an external error is parameterised via the assignment logic (C0410). In order to generate the fault message, a digital signal is used, e. g. a digital input.

8.7 Infrared data transmission (IrDA)

Via the IrDA interface you parameterise the vehicle control system. Additionally you can query status information and operate the vehicle control system in manual operation.

The IrDA eye is on the control system on the left next to the 7-segment display. Details on the operation of the software surfaces can be found in the corresponding Manuals.

Note!

How to ensure the correct data transmission:

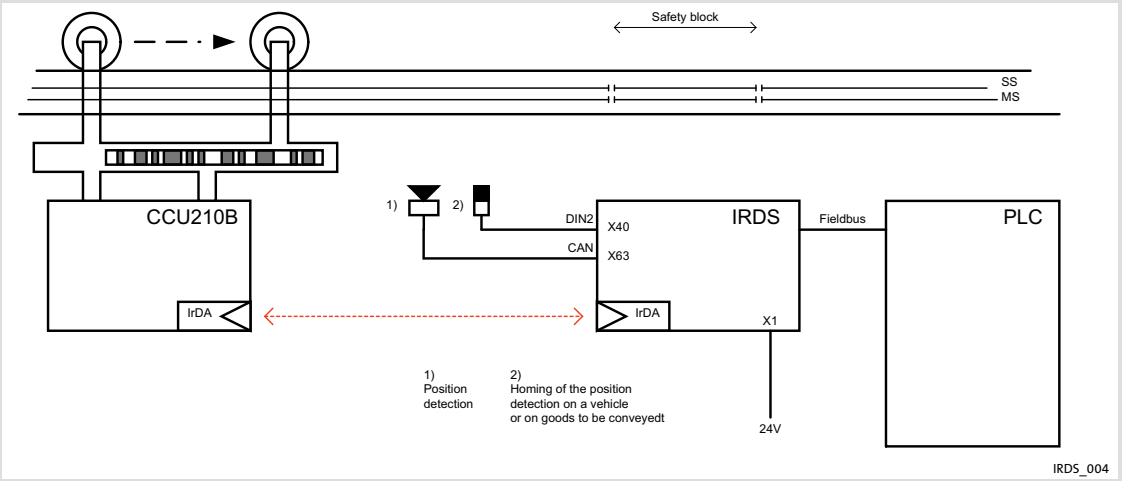
- ► The general IrDA guidelines from the ”Physical Layer Specification Version 1.4” IrDA standard must be observed!
- ► The files 82S8219V_XX.pdb and 82S8219V_XX.pfa must be saved on the PDA in the \SD card\DFT-Projects\ directory.
- ► The infrared windows of the PDA and the vehicle control system have to be aligned with each other.
- ► The distance should be as small as possible.
- ► There must be no other nodes between the vehicle control system and PDA within a 60° field of view!
- ► Flash lamps, laser scanners or other light sources can interfere the IrDA transmission!

Codes for parameter setting

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0126	RW	EXT	4	0			Configuration of IrDA error monitoring	📖 65
					0	Off		
					1	Error		
					2	Warning		

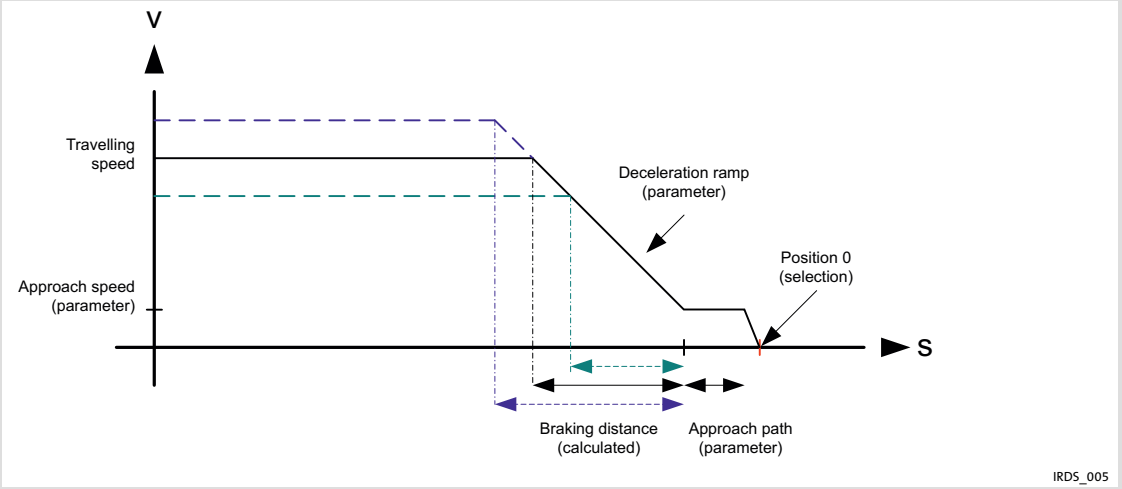
8.8 IrDA positioning

By means of the IrDA positioning, an electric monorail overhead conveyor vehicle can be positioned to a millimeter value specified via fieldbus within the IrDA transmission range of the IRDS data station. This requires the connection of a CAN bus position measuring sensor and a digital reference sensor to the IRDS data station. A bar code tape the position values of which can be selected optionally due to homing, and which matches the measuring system, is installed on the electric monorail overhead conveyor vehicle.



Procedure:

- A travel command via the SS control bar is continuously pending.
- Via fieldbus, the system control (PLC) reports to the the IRDS infrared data station (e.g. Profinet) via control bit that a vehicle is entering the area and that positioning to the set position specified by the fieldbus is to be executed. From this time on, there is an attempt to establish IrDA communication between the IRDS and the vehicle control system.
- The measuring system connected to the IRDS determines the actual position via the position codes installed on the vehicle.
- The position detection value is referenced to the value 0 mm by the ”Homing” sensor. The actual position of the vehicle is now also reported to the system control as a status value via fieldbus. A new homing process by unintended switching of the reference sensor is blocked and is only released again via the fieldbus control bit after the next positioning activation.
- An IrDA transmission error or position detection error is indicated to the system control by the fieldbus.
- Depending on the current travelling speed and the deceleration ramp set, the vehicle control system calculates the brake application point required and executes positioning to the position specified.



- Via IrDA, the vehicle control system reports to the infrared data station that positioning has been carried out successfully (position reached and drive stopped), and the data station indicates this to the system control as fieldbus status bit.
- Exiting the position and thus the deactivation of the positioning function is triggered by resetting the fieldbus control bit.

Codes for parameter setting

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0131	RW	EXT	4	0				Configuration of positioning error monitoring	📖 66
					0	Off			
					1	Error			
					2	Warning			
C0491	RW	EXT	2	150				IrDA positioning approach path	📖 66
					0	{mm}	2000		
C0492	RW	EXT	4	5.0				IrDA positioning approach speed	📖 66
					1	{Hz}	50.0		
C0493	RW	EXT	1	50				IrDA positioning deceleration time	📖 66
					1	{Hz/s}	255		
C0495	RW	EXT	2	3				IrDA positioning braking distance correction	📖 66
					1	{mm}	100		
C0496	RW	EXT	2	3				IrDA positioning position window	📖 66
					1	{mm}	100		
C0612	R		2					Status of IrDA position value [mm]	📖 66
					0	{mm}	32768		

8.9 Infrared remote control (IrRC)

Via the infrared remote control you can operate the vehicle control system in manual operation.

In C0480 you configure the change-over to the manual infrared operation via the key [green].

You exit the manual infrared operation by pressing the key [red] or by pressing the On/Off switch.

Note!
The manual infrared operation is not reset by mains switching.

In the manual infrared operation the following functions are provided:

Key	Function	Comment
0	Acknowledge error	An error can also be acknowledged in automatic operation by the key [0]: For this, press the key [0] for approx. 1.5 seconds.
1	V1	Activation of the motor with clockwise rotating field and Vx
2	V2	
3	V3	
4	V4	
5	V5	
6	V6	
7	V1	Activation of the motor with anti-clockwise rotating field and Vx
8	V2	
9	V3	
F4	Open brake	

Codes for parameter setting

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0480	RW	EXT	4	2		Activation method for infrared remote control Ir-RC	📖 68
					0 Ir-RC inactive		
					1 Activation by key [green]	How to activate the manual infrared operation: 1. Press key [green] for approx. 1 second. 2. Manual infrared operation is active.	
					2 Activation by key [green] and three-digit code	How to activate the manual infrared operation: 1. Press key [green] for approx. 1 second. 2. Automatic operation is interrupted. 3. In the 7-segment display a three-digit number is shown. 4. Enter this number correctly via the IR-RC keys within the next 5 seconds. 5. Manual infrared operation is active. If the entry is incorrect, the vehicle control system automatically switches over to automatic operation again.	
C0481	RW	EXT	4	0		Infrared remote control display switch-over	📖 68
					0 IR-RC display switch-over not active		
					1 IR-RC display switch-over with keys [↑], [↓], and [F1] active		

8.10 Half Wave Code (HWC)

The Half Wave Code (HWC) is used to specify commands from the higher-level system control to the vehicle control system. Like this, up to 200 different commands can be transmitted on one control bar (SS2).

”HWC Match Codes” (HWC1-16) can be linked to control functions. When an HWC command that is entered as ”HWC Match Code” is received, the function linked to it is executed. In addition, logic OR operations can be defined by ”HWC Match Codes”.

Example:

Request:

HWC command 4	...forward travel with V1
HWC command 5	...backward travel with V1
HWC command 6	...forward travel with V2
HWC command 7	...backward travel with V2

Parameter settings to solve the request:

HWC Match Code 1 (C0244/1)	= 4
HWC Match Code 2 (C0244/2)	= 5
HWC Match Code 3 (C0244/3)	= 6
HWC Match Code 4 (C0244/4)	= 7
HWC-OR1 (C0245/1)	= 6 (HWC2 OR HWC4)
Function of motor V1 (C0410/1)	= 64 (link to HWC1)
Function of motor V2 (C0410/2)	= 65 (link to HWC2)
Function of motor V3 (C0410/3)	= 66 (link to HWC3)
Function of motor V4 (C0410/4)	= 67 (link to HWC4)
Function of CCW rotation (C0410/9)	= 96 (link to HWC-OR1)

Speed selection

With the ”HWC Code Range”, an HWC command range can be used as speed selection. For this purpose, a speed (e.g. minimum assembly line speed) is assigned to a command number; a higher speed (e.g. maximum assembly line speed) is assigned to a higher command number. The speeds for all command numbers in-between are automatically calculated by the control system.

Calculation of the variable speed (Vv) when using the ”HWC Code Range”:

HWC_min ...C0251/1
HWC_max ...C0251/2
Vv_min ...C0252/1
Vv_max ...C0252/2
HWC_act ...currently received HWC command

Vv = Vv_min + (HWC_act -HWC_min) * ((Vv_max -Vv_min) / (HWC_max -HWC_min))

Example:

HWC_min = 10
HWC_max = 190
Vv_min = 500 mm/min
Vv_max = 5000 mm/min
HWC_act = 11

Vv = 500 mm/min + (11 -10) * ((5000 mm/min -500 mm/min) / (190 -10))

Vv = 500 mm/min + 1 * 25 mm/min = 525 mm/min

Codes for parameter setting

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0240	RW	EXT	1	2			Configuration of HWC control bar	📖 70
					1	HWC via control bar 1 SS1		
					2	HWC via control bar 2 SS2		
C0241	RW	EXT	1	3			Number of HWC commands for acceptance	📖 70
					1	15		
C0242	RW	EXT	1	3			Number of HWC command changes for deletion	📖 70
					2	15		
C0243	RW	EXT	1	0			Special HWC operating mode	📖 70
					0	Standard		
					1	FI automatic stop		
					2	Fast asynchronous 0 detection		
					3	FI automatic stopn and fast asynchronous 0 detection		

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0244							HWC match codes	📖 70
1	RW	EXT	1	0	0	201	HWC match code 1	
2							HWC match code 2	
3							HWC match code 3	
4							HWC match code 4	
5							HWC match code 5	
6							HWC match code 6	
7							HWC match code 7	
8							HWC match code 8	
9							HWC match code 9	
10							HWC match code 10	
11							HWC match code 11	
12							HWC match code 12	
13							HWC match code 13	
14							HWC match code 14	
15							HWC match code 15	
16							HWC match code 16	
C0245							Logic OR operations for HWC match codes	📖 70
1	RW	EXT	2	0	0	65535	HWC-OR1	
2							HWC-OR2	
3							HWC-OR3	
4							HWC-OR4	
5							HWC-OR5	
6							HWC-OR6	
7							HWC-OR7	
8							HWC-OR8	
C0250	RW	EXT	1	0			HWC code range control mode	📖 70
					0	No control		
					1	Control active		
					2	Control with pick-up after stop function		
C0251							HWC code range commands	📖 70
1	RW	EXT	1	201	1	201	HWC command for lowest variable speed (Vv_min)	
2							HWC command for highest variable speed (Vv_max)	
C0252							HWC code range speeds	📖 70
1	RW	EXT	2	500	10 {mm/min}	65535	HWC lowest variable speed (Vv_min)	
2							HWC highest variable speed (Vv_max)	
C0254	RW	EXT	1	50			HWC acceleration time for variable speed Vv	📖 70
					1 {Hz/s}	255		
C0255	RW	EXT	1	50			HWC deceleration time for variable speed Vv	📖 70
					1 {Hz/s}	255		

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0605	R		1			Status of current HWC command	📖 70
					0 201		

8.11 Open and closed loop control

A virtual set position is continuously calculated from the setpoint frequency specified, which is usually determined via HWC code range. This set position is compared to the actual position, which is determined by means of an actual value encoder (e.g. incremental encoder), and is compensated correspondingly. It is attempted to reach the rated slip of the motor by reducing the boost voltage and to compensate greater system deviations by adapting the actual frequency.

For setting the control, only the encoder constant [Inc/m], the gearbox factor [mm/min], and the control limitation [Hz/10] have to be parameterised.

For monitoring, an error message can be generated when a parameterisable maximally permissible system deviation is exceeded. Furthermore a corresponding error message for the event that the control is active and the feedback (e.g. defective pulse encoder) is not working is output.

Codes for parameter setting

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0129	RW	EXT	4	0		Configuration of encoder error monitoring	📖 70
					0 Off		
					1 Error		
					2 Warning		
C0130	RW	EXT	4	0		Configuration of error monitoring system deviation	📖 70
					0 Off		
					1 Error		
					2 Warning		
C0250	RW	EXT	1	0		HWC code range control mode	📖 70
					0 No control		
					1 Control active		
					2 Control with pick-up after stop function		
C0257	RW	EXT	4	5.0		HWC control limitation (± of setpoint frequency)	📖 70
					1.0 {Hz} 10.0		
C0258	RW	EXT	2	200		HWC maximum system deviation	📖 70
					2 {mm} 5000		
C0261	RW	EXT	2	1000		Encoder constant	📖 70
					50 {inc/m} 5000		

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0264	RW	EXT	4	1.5				Voltage control V-boost minimum	📖 70
					1	{%}	25.5		
C0265	RW	EXT	4	5.0				Voltage control V-boost maximum	📖 70
					4	{%}	25.5		
C0606	R		2					Status of encoder position value	📖 70
					0	{mm}	65535		
C0607	R		2					Status of system deviation	📖 70
					0	{mm}	32768		

8.12 Status messages

By means of the status messages you are quickly provided with an overview of the vehicle control system status.

Codes for parameter setting

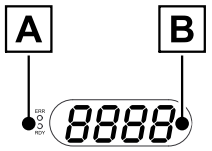
Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0050	R		4					Current drive frequency	📖 75
					0	{Hz}	120.0		
C0053	R		4					Current DC-bus voltage	📖 75
					0	{V}	1000		
C0054	R		4					Current motor current	📖 75
					0	{A}	20.0		
C0056	R		4					Current output stage temperature	📖 75
					0	{°C}	255		
C0179	R	INT	4					Power-on time	📖 75
					0	{min}	7884000		
C0180	R		1					Seconds counter	📖 75
					0	{s}	59		
C0183								Limit values of the DC-bus voltage	📖 75
1	R		4		0	{V}	1000	Minimum	
2								Maximum	
C0184								Limit values of the current value	📖 75
1	R	INT	4		0	{A}	20.0	Reserved	
2								Maximum	
C0186								Limit values of the output stage temperature	📖 75
1	R	INT	4		0	{°C}	255	Minimum	
2								Maximum	
C0196	R	INT	4					Average output stage temperature	📖 75
					0	{°C}	255		

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0601	R		2			Status of digital inputs (bit coded)	📖 75
					0 65535		
					Bit 0 Status DIN1	Digital input DIN1	
					Bit 1 Status DIN2	Digital input DIN2	
					Bit 2 Status DIN3	Digital input DIN3	
					Bit 3 Status DIN4	Digital input DIN4	
					Bit 4 Status DIN5	Digital input DIN5	
					Bit 5 Status DIN6	Digital input DIN6	
					Bit 6 Status DIN7	Digital input DIN7	
					Bit 7 Status DIN8	Digital input DIN8	
					Bit 8 Status SS1 positive half wave	Control bar 1 positive half wave	
					Bit 9 Status SS1 negative half wave	Control bar 1 negative half wave	
					Bit 10 Status SS1 full-wave	Control bar 1 full-wave	
					Bit 11 Reserved		
					Bit 12 Status SS2 positive half wave	Control bar 2 positive half wave	
					Bit 13 Status SS2 negative half wave	Control bar 2 negative half wave	
					Bit 14 Status SS2 full-wave	Control bar 2 full-wave	
					Bit 15 Reserved		
C0602	R		2			Status of logic operations (bit coded)	📖 75
					0 65535		
					Bit 0 Status link OR1	OR operations	
					Bit 1 Status link OR2		
					Bit 2 Status link OR3		
					Bit 3 Status link OR4		
					Bit 4 Status link OR5		
					Bit 5 Status link OR6		
					Bit 6 Status link OR7		
					Bit 7 Status link OR8		
					Bit 8 Status link AND1	AND operations	
					Bit 9 Status lnk AND2		
					Bit 10 Status link AND3		
					Bit 11 Status link AND4		
					Bit 12 Status link AND5		
					Bit 13 Status link AND6		
					Bit 14 Status link AND7		
					Bit 15 Status link AND8		
C0603	R		1			Status of digital outputs (bit coded)	📖 75
					0 255		
					Bit 0 Status DOUT1	Digital output DOUT1	
					Bit 1 Status DOUT2	Digital output DOUT2	
					Bit 2 Reserved		
					Bit 3 Reserved		
					Bit 4 Status MS1 positive half wave	Message bar 1 positive half wave	
					Bit 5 Status MS1 negative half wave	Message bar 1 negative half wave	
					Bit 6 Reserved		
					Bit 7 Reserved		

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0605	R		1					Status of current HWC command	📖 70
					0		201		
C0606	R		2					Status of encoder position value	📖 70
					0	{mm}	65535		
C0607	R		2					Status of system deviation	📖 70
					0	{mm}	32768		
C0612	R		2					Status of IrDA position value [mm]	📖 66
					0	{mm}	32768		
C0620	R	EXT	4					Parameters: checksum (without C0520, C0521, C0522 and C0523)	📖 75
					0		4294967295		

9 Troubleshooting and fault elimination

9.1 Status display



CCU210_002F

A	LED display: drive status
B	4-digit 7-segment display for error messages, warning signals, and status messages

Pos.	LED	Colour	Status	Description
A	ERR	red	off	No fault
			flashing	Fault active
	RDY	green	on	Device enabled
			flashing	Device inhibited

Standard displays

Standard displays during operation (C0500 = 0)		
Pos.	**Display**	**Description**
B	8. 8. 8. 8.	Power-up display for 0.5 s
	2. 3 4	Software version for 0.5 s
	F 8 8 8	Error message (blinking)
	H 8 8 8	Warning signal (blinking)
	I n H	Controller inhibit active (C0040)
	O F F	ON/OFF switch in OFFposition
	P A R	Parameters are saved in the EEPROM
	P d A	Manual PDA operation via IrDA active
	I R C	Manual infrared operation active
	1	V1 forwards active
	2	V2 forwards active
	3	V3 forwards active
	4	V4 forwards active
	5	V5 forwards active
	6	V6 forwards active
	7	V7 forwards active
	8	V8 forwards active
	1 -	V1 backwards active
	2 -	V2 backwards active
	3 -	V3 backwards active
	4 -	V4 backwards active
	5 -	V5 backwards active
	6 -	V6 backwards active
	7 -	V7 backwards active
	8 -	V8 backwards active
	R 8. 8 8	Vv (variable frequency selection HWC Code Range) forward active
	d	Starting delay function active
	P 0. 8 8	IrDA positioning active
	P 0. -| |-	IrDA positioning - position reached
B	1 '	SensoPart: parameter set 1 active
	2 ''	SensoPart: parameter set 2 active
	8 0	"Open brake" active
	S 1.	Stop 1 active
	S 2.	Stop 2 active
	S 3.	Stop 3 active
	S 4.	Stop 4 active
	S d.	SensoPart: stop distance active
	S E.	SensoPart: stop "Emergency distance" active
	L b.	SensoPart: creeping speed active
	L d.	SensoPart: approach speed active
	L 1.	Frequency limitation 1 active
	L 2.	Frequency limitation 2 active
	L 3.	Frequency limitation 3 active
	L 4.	Frequency limitation 4 active
	8 8	Current drive frequency [Hz]

Special displays

Via C0500 you can activate some special displays which are shown during operation instead of the standard displays.

Pos.	Display	Description
B	-88.8	Drive frequency with sign [Hz]
	888U	DC-bus voltage [V]
	88.8A	Motor current [A]
	888C	Output stage temperature [°C]
	8888	Status of the digital inputs and control bars [hex]
	88	Status of the digital outputs and message bars [hex]
	8888	SensoPart: distance [mm]
	88	Status of the seconds counter [s]
	C888	HWC command status
	8888	Status of encoder position value [mm]
	-888	Status of system deviation with sign [mm]
	-888	Status of IrDA difference position with sign [mm]
	8.8.8.8.	User-specific display

Codes for parameter setting

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0500	RW	EXT	4	0			Display code for 7-segment display	📖 80
					0	Standard display		
					1	Drive frequency with sign [Hz]		
					2	DC-bus voltage [V]		
					3	Motor current [A]		
					5	Output stage temperature [°C]		
					7	Status of the digital inputs and control bars [hex]		
					8	Status of the digital outputs and message bars [hex]		
					9	SensoPart: distance [mm]		
					10	Status of the seconds counter [s]		
					11	HWC command status		
					12	Status of encoder position [mm]		
					13	Status of system deviation [mm]		
					15	IrDA position value [mm]		
					201	Reserved for customer-specific displays		

9.2 Fault messages

In the fault memory all error messages occurred so far are recorded. The error number is written in C0168 and the corresponding error occurrence time in C0169. For the error occurrence time the mains operating time in minutes from C0179 is used.

The fault memory works like a shift register:

- ► The latest error is always saved in C0168/1.
- ► The first error is always saved in C0168/10.

Codes for parameter setting

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0160	R		4				No. of the current warning signal	
					0	255		
C0161	R		4				No. of the current error message	
					0	255		
C0167 [PWD]	RW		4	0			Fault memory (C0168, C0169) and limit value memory (C0183-C0196) are deleted if: ● the service password has been entered in C0007 and ● C0167 is set to ”1”. **Only** the limit value memory (C0183-C0196) is deleted if: ● the user password has been entered in C0007 and ● C0167 is set to ”1”.	
					0	Action executed		
					1	Delete fault memory and/or limit value memory		
C0168							Fault memory: no. of the 10 faults that occurred last	📖 81
1	R	INT	4		1	255	Error 1 (latest)	
2							Error 2	
3							Error 3	
4							Error 4	
5							Error 5	
6							Error 6	
7							Error 7	
8							Error 8	
9							Error 9	
10							Error 10 (first)	

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0169								Error memory: times of the 10 errors that occurred last	📖 81
1	R	INT	4		0	{min}	7884000	Time error 1 (latest)	
2								Time error 2	
3								Time error 3	
4								Time error 4	
5								Time error 5	
6								Time error 6	
7								Time error 7	
8								Time error 8	
9								Time error 9	
10								Time error 10 (first)	

Note!

► The motor control system always stops immediately when an error occurs!
► The motor control system is not stopped when a warning occurs!

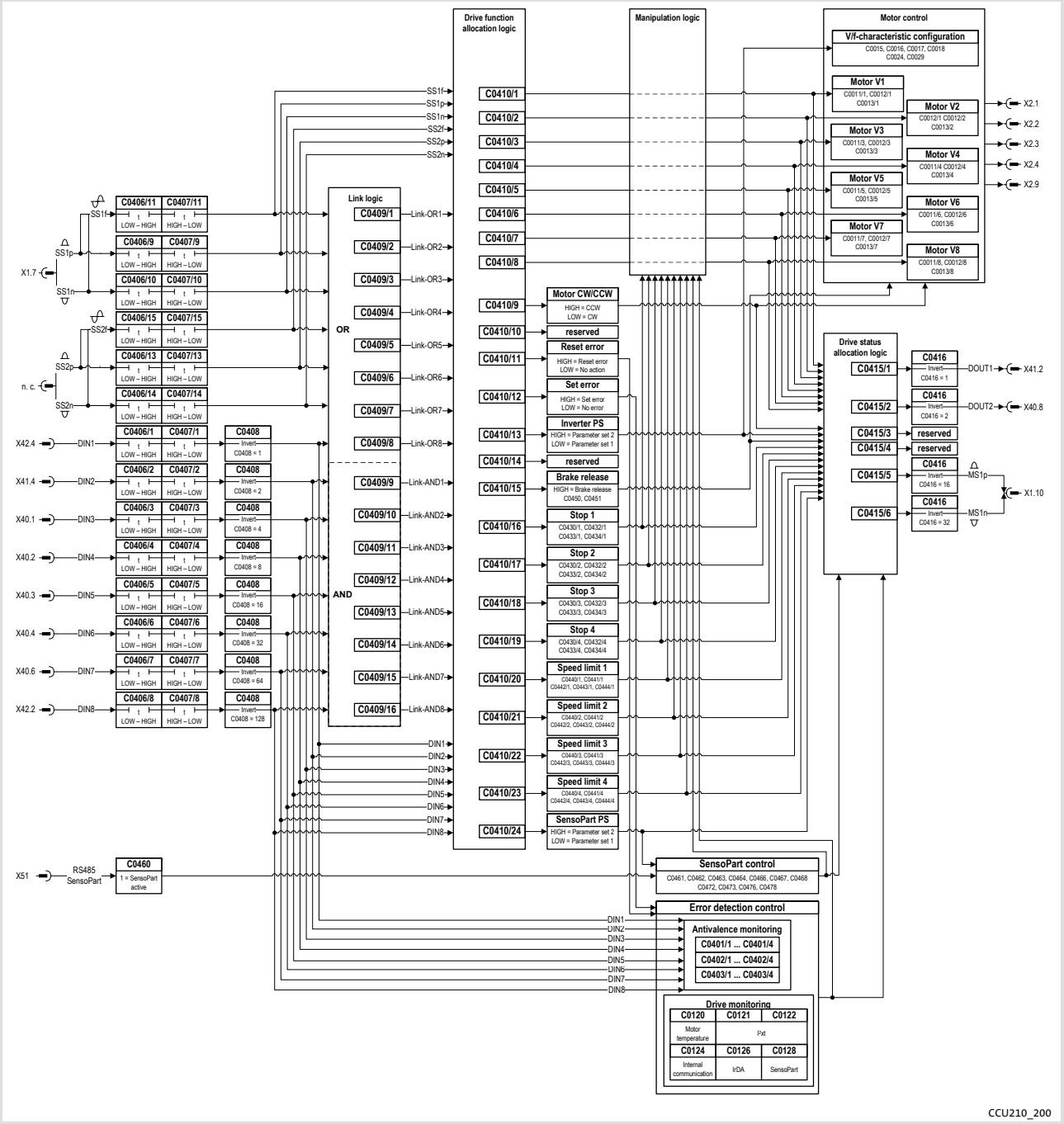
Display[B]	Fault	Cause	Remedy
F001 H001	Motor: overcurrent	Motor overloaded by impermissible continuous current	Check drive dimensioning.
		Rated motor current set incorrectly	Check setting of C0120.
F002	Control system: internal temperature too high	Ambient temperature too high	Reduce ambient temperature.
F003 H003	Control system: mains voltage too low	Failure of one or several mains phases	• Check supply feeder/collector. • Check fuses.
		Mains voltage too low	Check mains voltage.
F004	Control system: mains voltage too high	Mains voltage too high	• Check supply feeder/collector. • Check mains voltage. • Check setting of C0016.
F005	Control system: fault in the output stage	Fault in wiring on the motor side	Correct motor wiring.
		Motor defective	Replace motor.
		Control system defective	Replace control system.
F006 H006	Motor: high-resistance thermistor	Motor too warm from impermissibly high currents	Check drive dimensioning.
		No PTC or thermal contact connected	Connect PTC or thermal contact or switch off monitoring with C0120 = 0.
F008	Frequency inverter: parameter error	Inconsistency within the parameters of the frequency inverter, e. g. because the external data memory has been removed during a voltage was applied	• Load Lenze setting • Transfer parameter data again. Thereby always wait until the PAr message goes out. Only then switch off the voltage.
F011 H011	Motor: phase U failed	Motor phase U failed	Check motor and motor wiring.
F012 H012	Motor: phase V failed	Motor phase V failed	Check motor and motor wiring.
F013 H013	Motor: phase W failed	Motor phase W failed	Check motor and motor wiring.
F014	Frequency inverter: overload of internal brake resistor	Overload by operation in generator mode	• Let control system cool down. • Reduce number of brake applications. • Reduce loading of vehicle.
F018	Frequency inverter: initialisation error	Internal communication error	Switch off mains voltage and then switch it on again. If the error occurs again, replace control system
F019	Frequency inverter: not ready for operation	Internal communication error	Switch off mains voltage and then switch it on again. If the error occurs again, replace control system.
H020	Control: 24 V voltage supply too low	• Failure of one or several mains phases • Mains voltage too low • Overload of the 24 V voltage supply on the control connections for encoders, sensors, etc.	• Check supply feeder/collector • Check fuses • Check mains voltage • Check encoders, sensors connected and their cabling

Display[B]	Fault	Cause	Remedy
F021	Control system: internal system error	Various	1. Transfer parameter data again. Thereby always wait until the PAr message goes out. Only then switch off the voltage. 2. Switch off mains voltage and then switch it on again. If the error occurs again, replace control system.
F022	Control system: internal parameter error	Various	1. Transfer parameter data again. Thereby always wait until the PAr message goes out. Only then switch off the voltage. 2. Switch off mains voltage and then switch it on again. If the error occurs again, replace control system.
F024 H024	Control system: internal communication error	Internal communication erroneous	● Switch off mains voltage and then switch on again. ● If the error occurs again, replace control system.
F025 H025	IrDA: communication error	Transmission distance too far	Reduce distance between communication partners.
		Fault due to external light	Minimise parasitic scattered light by appropriate measures.
F026 H026	SensoPart: Step monitoring error	The SensoPart distance has changed abruptly and permanently	Acknowledge error
F027 H027	SensoPart: communication error	SensoPart connected incorrectly	Check wiring between SensoPart and control system.
		Connection interrupted	
		SensoPart defective	Replace SensoPart.
F028 H028	Encoder: Error	The encoder value does not change in spite of motor activation.	● Clutch in motor ● Vehicle is blocked mechanically ● Check encoder function and wiring
F029 H029	Control: Deviation too great	The tolerated system deviation has been exceeded.	● Vehicle is mechanically rough-running ● Check control parameters ● Check encoder function
F030	Control system: external error	A digital signal assigned with the ”Set fault” function is active	Eliminate external error.
F031	Control system: non-equivalence error 1	Invalid state of two digital inputs	● Check sensors. ● Check sensor wiring. ● Check linking of the inputs in C0402/x. ● Where required, increase delay time in C0403/x.
F032	Control system: non-equivalence error 2		
F033	Control system: non-equivalence error 3		
F034	Control system: non-equivalence error 4		
F035 H035	Positioning: Error	The position specified via the IrDA could not be reached or IrDA communication during positioning is disturbed.	● Check brake function ● Vehicle is mechanically rough-running ● Check parameters for positioning ● Reduce distance between communication partners. ● Minimise parasitic scattered light by appropriate measures.

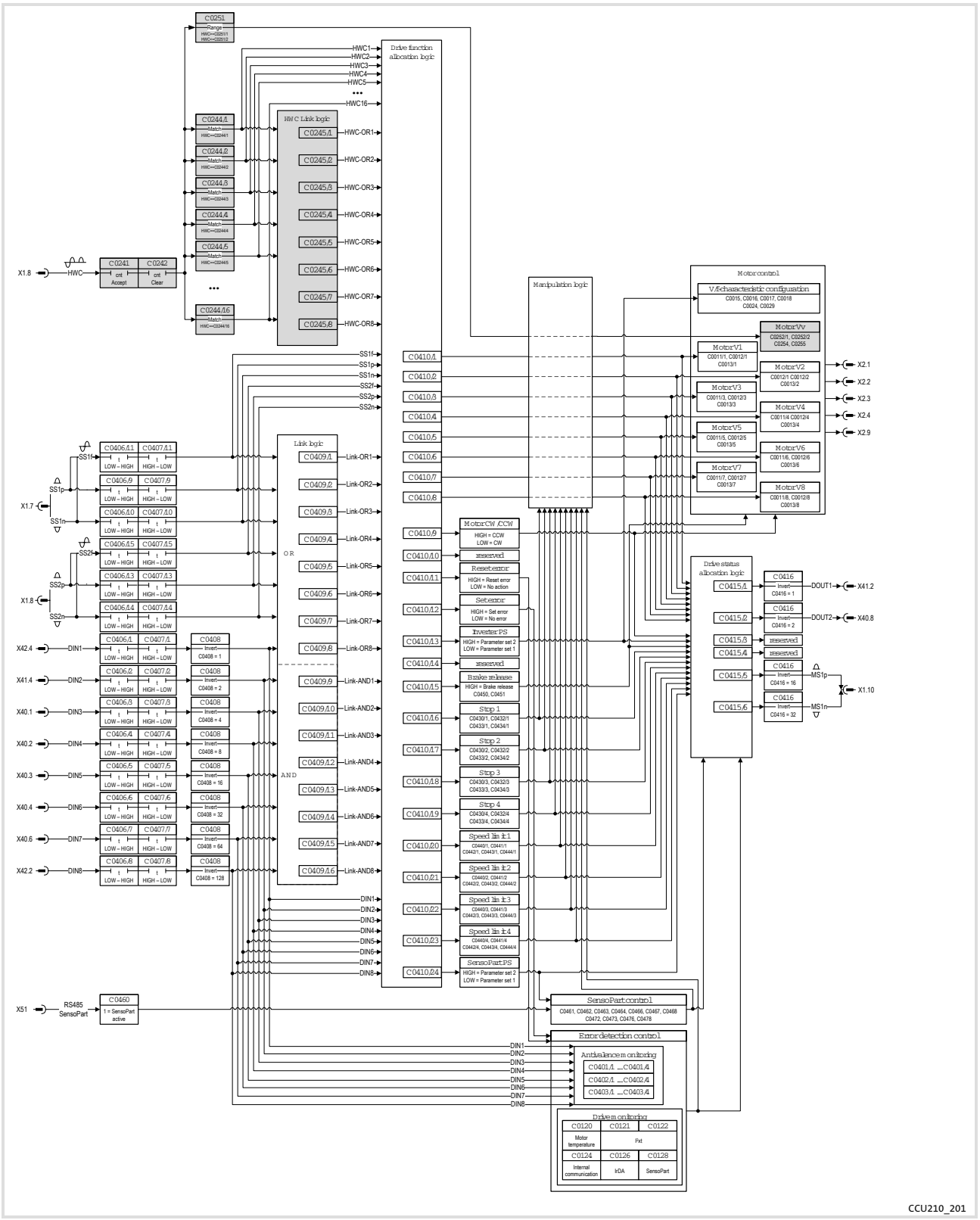
10 Appendix

10.1 Signal processing - overview

Signal processing without HWC function



Signal processing with HWC function



10.2 Code table

How to read the code table

Column	Abbreviation	Meaning
Code		
No.	Cxxxx	Code No. Cxxxx
	1	Subcode 1 of Cxxxx
	2	Subcode 2 of Cxxxx
	[PWD]	Code can only be altered after the service password has been entered in C0007.
⇧⇩		Access to the code
	RW	Read and write
	R	Read only
🖫		Memory location
	INT	Internally in the Flash memory
	EXT	Externally in the data connector
Byte		
		Data length in bytes
Possible settings		
Lenze		Setting at delivery
		Setting after loading the Lenze setting with C0002 = 1
Selection	1 {%} 99	Minimum value {Unit} Maximum value
Description		
		Short description of the code

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0002	RW		4	0				Parameter set management	
					1	Load Lenze setting			
					2	Reserved			
					3	Write all parameters in EEPROM			
C0003 [PWD]	RW	INT	4	1				Storage method for parameters	
					0	Do not save parameters in EEPROM			
					1	Save parameters in external EEPROM			
					2	Save parameters in internal EEPROM			
C0006	RW	EXT	4	0				Parameter version, freely available for users	
					0		255		
C0007	RW		4	0				Password (PWD)	
					0		65535		
C0010	RW	EXT	4	10000				Conversion factor: speed at 50 Hz drive frequency	📖 52
					0	{mm/min}	65535		

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0011								Drive frequency for ...	📖 52
1	RW	EXT	4	0.0	0.0	{Hz}	120.0	... V1	
2				0.0				... V2	
3				0.0				... V3	
4				0.0				... V4	
5				0.0				... V5	
6				0.0				... V6	
7				0.0				... V7	
8				0.0				... V8	
C0012								Acceleration time for ...	📖 52
1	RW	EXT	4	50	1	{Hz/s}	255	... V1	
2				50				... V2	
3				50				... V3	
4				50				... V4	
5				50				... V5	
6				50				... V6	
7				50				... V7	
8				50				... V8	
C0013								Deceleration time for ...	📖 52
1	RW	EXT	4	50	1	{Hz/s}	255	... V1	
2				50				... V2	
3				50				... V3	
4				50				... V4	
5				50				... V5	
6				50				... V6	
7				50				... V7	
8				50				... V8	
C0014	RW	EXT	4	80				Deceleration time for quick stop functions: ● On/Off switch ● Error ● SensoPart trip-out	📖 52
					1	{Hz/s}	255		
C0015	RW	EXT	4	0				Operating mode	📖 41
					0	V/f characteristic control			
					1	Reserved			
					2	Reserved			
C0016	RW	EXT	4	400				Mains voltage	📖 41
					0	{V}	480		
C0017	RW	EXT	4	0				Mains frequency	📖 41
					0	50 Hz			
					1	60 Hz			

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0018								Switching frequency of the inverter in ...	📖 41
1	RW	EXT	4	2		8 kHz		... Parameter set 1	
2				2		8 kHz		... Parameter set 2	
					Possible values				
					0	2 kHz			
					1	4 kHz			
					2	8 kHz			
C0019								Operating threshold for automatic brake in ...	
1	RW	EXT	4	0	0	{Hz}	20	... Parameter set 1	
2				0				... Parameter set 2	
C0022								Rated motor current in ...	📖 61
1	RW	EXT	4	1.0	0	{A}	20.0	... Parameter set 1	
2				1.0				... Parameter set 2	
C0024								V/f characteristic – U-boost voltage in ...	📖 41
1	RW	EXT	4	5.0	1	{%}	25.5	... Parameter set 1	
2				5.0				... Parameter set 2	
C0029								V/f characteristic – base frequency in ...	📖 41
1	RW	EXT	4	50.0	0	{Hz}	120.0	... Parameter set 1	
2				50.0				... Parameter set 2	
C0040	RW		4	0				Controller inhibit	
					0	Controller inhibited			
					1	Controller enabled			
C0043	RW		4	0				Acknowledge fault	
					0	Action executed			
					1	Acknowledge fault			
C0050	R		4					Current drive frequency	📖 75
					0	{Hz}	120.0		
C0053	R		4					Current DC-bus voltage	📖 75
					0	{V}	1000		
C0054	R		4					Current motor current	📖 75
					0	{A}	20.0		
C0056	R		4					Current output stage temperature	📖 75
					0	{°C}	255		
C0089	R		4					Frequency inverter - software version	
C0093	R		4					Device type	
C0099	R		4					Software version	
						{xy}		x = main version, y = subversion	
C0118	RW	INT	1	10				Configuration of brake resistance monitoring (WR only with PWD)	
					10	Resistance 200 Ω/100 W			
					30	Resistance 150 Ω/300 W			

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0120	RW	EXT	4	1			Configuration of motor temperature monitoring	📖 64
					0	Off		
					1	Error		
					2	Warning		
C0121	RW	EXT	4	2			Tripping class for I^2xt monitoring	📖 61
					1	Tripping class CLASS 10A		
					2	Tripping class CLASS 10		
					3	Tripping class CLASS 20		
					4	Tripping class CLASS 30		
C0122	RW	EXT	4	1			Configuration of I^2xt monitoring	📖 61
					0	Off		
					1	Error		
					2	Warning		
C0124	RW	EXT	4	1			Configuration of monitoring of internal communication errors	
					0	Off		
					1	Error		
					2	Warning		
C0126	RW	EXT	4	0			Configuration of IrDA error monitoring	📖 65
					0	Off		
					1	Error		
					2	Warning		
C0128	RW	EXT	4	1			Configuration of SensoPart error monitoring	📖 57
					0	Off		
					1	Error		
					2	Warning		
C0129	RW	EXT	4	0			Configuration of encoder error monitoring	📖 70
					0	Off		
					1	Error		
					2	Warning		
C0130	RW	EXT	4	0			Configuration of error monitoring system deviation	📖 70
					0	Off		
					1	Error		
					2	Warning		
C0131	RW	EXT	4	0			Configuration of positioning error monitoring	📖 66
					0	Off		
					1	Error		
					2	Warning		
C0135	R		2				Reserved	
C0150	R		2				Reserved	
C0160	R		4				No. of the current warning signal	
					0	255		

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0161	R		4					No. of the current error message	
					0		255		
C0167 [PWD]	RW		4	0				Fault memory (C0168, C0169) and limit value memory (C0183-C0196) are deleted if: ● the service password has been entered in C0007 and ● C0167 is set to "1". **Only** the limit value memory (C0183-C0196) is deleted if: ● the user password has been entered in C0007 and ● C0167 is set to "1".	
					0	Action executed			
					1	Delete fault memory and/or limit value memory			
C0168								Fault memory: no. of the 10 faults that occurred last	📖 81
1	R	INT	4		1		255	Error 1 (latest)	
2								Error 2	
3								Error 3	
4								Error 4	
5								Error 5	
6								Error 6	
7								Error 7	
8								Error 8	
9								Error 9	
10								Error 10 (first)	
C0169								Error memory: times of the 10 errors that occurred last	📖 81
1	R	INT	4		0	{min}	7884000	Time error 1 (latest)	
2								Time error 2	
3								Time error 3	
4								Time error 4	
5								Time error 5	
6								Time error 6	
7								Time error 7	
8								Time error 8	
9								Time error 9	
10								Time error 10 (first)	
C0179	R	INT	4					Power-on time	📖 75
					0	{min}	7884000		
C0180	R		1					Seconds counter	📖 75
					0	{s}	59		
C0183								Limit values of the DC-bus voltage	📖 75
1	R		4		0	{V}	1000	Minimum	
2								Maximum	
C0184								Limit values of the current value	📖 75
1	R	INT	4		0	{A}	20.0	Reserved	
2								Maximum	

Code					Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0186								Limit values of the output stage temperature	📖 75
1	R	INT	4		0	{°C}	255	Minimum	
2								Maximum	
C0196	R	INT	4					Average output stage temperature	📖 75
					0	{°C}	255		
C0200	R		14					Software ID (1 string)	
					82S8219V_xyz00			x = main version, y = subversion, z = variant	
C0202								Software ID (4 strings)	
1	R		4		82S8			Characters 1-4	
2					219V			Characters 2-8	
3					_xyz			Characters 9-12 x = main version, y = subversion, z = variant	
4					00			Characters 13-14	
C0204	R	INT	4					Serial number	
					0		4294967295		
C0206	R	INT	4					Production date	
					0		9999	Format ”Year + calendar week” (yyww)	
C0240	RW	EXT	1	2				Configuration of HWC control bar	📖 70
					1	HWC via control bar 1 SS1			
					2	HWC via control bar 2 SS2			
C0241	RW	EXT	1	3				Number of HWC commands for acceptance	📖 70
					1		15		
C0242	RW	EXT	1	3				Number of HWC command changes for deletion	📖 70
					2		15		
C0243	RW	EXT	1	0				Special HWC operating mode	📖 70
					0	Standard			
					1	FI automatic stop			
					2	Fast asynchronous 0 detection			
					3	FI automatic stopn and fast asynchronous 0 detection			

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0244							HWC match codes	📖 70
1	RW	EXT	1	0	0	201	HWC match code 1	
2							HWC match code 2	
3							HWC match code 3	
4							HWC match code 4	
5							HWC match code 5	
6							HWC match code 6	
7							HWC match code 7	
8							HWC match code 8	
9							HWC match code 9	
10							HWC match code 10	
11							HWC match code 11	
12							HWC match code 12	
13							HWC match code 13	
14							HWC match code 14	
15							HWC match code 15	
16							HWC match code 16	
C0245							Logic OR operations for HWC match codes	📖 70
1	RW	EXT	2	0	0	65535	HWC-OR1	
2							HWC-OR2	
3							HWC-OR3	
4							HWC-OR4	
5							HWC-OR5	
6							HWC-OR6	
7							HWC-OR7	
8							HWC-OR8	
C0250	RW	EXT	1	0			HWC code range control mode	📖 70
					0	No control		
					1	Control active		
					2	Control with pick-up after stop function		
C0251							HWC code range commands	📖 70
1	RW	EXT	1	201	1	201	HWC command for lowest variable speed (Vv_min)	
2							HWC command for highest variable speed (Vv_max)	
C0252							HWC code range speeds	📖 70
1	RW	EXT	2	500	10 {mm/min}	65535	HWC lowest variable speed (Vv_min)	
2							HWC highest variable speed (Vv_max)	
C0254	RW	EXT	1	50			HWC acceleration time for variable speed Vv	📖 70
					1 {Hz/s}	255		
C0255	RW	EXT	1	50			HWC deceleration time for variable speed Vv	📖 70
					1 {Hz/s}	255		

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0257	RW	EXT	4	5.0				HWC control limitation (± of setpoint frequency)	📖 70
					1.0	{Hz}	10.0		
C0258	RW	EXT	2	200				HWC maximum system deviation	📖 70
					2	{mm}	5000		
C0261	RW	EXT	2	1000				Encoder constant	📖 70
					50	{inc/m}	5000		
C0264	RW	EXT	4	1.5				Voltage control V-boost minimum	📖 70
					1	{%}	25.5		
C0265	RW	EXT	4	5.0				Voltage control V-boost maximum	📖 70
					4	{%}	25.5		
C0351	R	_	1	0				CAN baud rate	
					0	500 kbps			
					1	250 kbps			
					2	125 kbps			
C0390	RW		4					Reserved	
C0401				0				Configuration: response of the non-equivalence monitoring at the digital inputs	📖 63
1	RW	EXT	1	0	0		255	Non-equivalence monitoring 1	
2				0				Non-equivalence monitoring 2	
3				0				Non-equivalence monitoring 3	
4				0				Non-equivalence monitoring 4	
					Possible values				
					0	Error in the case of unequal levels at DINx			
					1	Error in the case of equal levels at DINx			
C0402								Configuration of non-equivalence monitoring of the digital inputs	📖 63
1	RW	EXT	1	0	0		255	Non-equivalence monitoring 1	
2				0				Non-equivalence monitoring 2	
3				0				Non-equivalence monitoring 3	
4				0				Non-equivalence monitoring 4	
					Possible values			For the non-equivalence monitoring only two digital inputs can be used each. Add values of the inputs monitored and enter in C0402/x: e. g. non-equivalence monitoring for DIN3 and DIN5 = 20.	
					0	No monitoring			
					1	DIN1			
					2	DIN2			
					4	DIN3			
					8	DIN4			
					16	DIN5			
					32	DIN6			
					64	DIN7			
					128	DIN8			

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0403								Deceleration of non-equivalence detection	📖 63
1	RW	EXT	4	0	0	{ms}	10000	Deceleration for C0402/1	
2				0				Deceleration for C0402/2	
3				0				Deceleration for C0402/3	
4				0				Deceleration for C0402/4	
C0406								Switch-on delay of digital input signals LOW ⇨ HIGH ...	📖 42
1	RW	EXT	4	0	0	{ms}	10000	... DIN1	
2				0				... DIN2	
3				0				... DIN3	
4				0				... DIN4	
5				0				... DIN5	
6				0				... DIN6	
7				0				... DIN7	
8				0				... DIN8	
9				0				... SS1 positive half wave	
10				0				... SS1 negative half wave	
11				0				... SS1 full-wave	
12				0				Reserved	
13				0				... SS2 positive half wave	
14				0				... SS2 negative half wave	
15				0				... SS2 full-wave	
16				0				Reserved	
C0407								Switch-off delay of digital input signals HIGH ⇨ LOW ...	📖 42
1	RW	EXT	4	0	0	{ms}	10000	... DIN1	
2				0				... DIN2	
3				0				... DIN3	
4				0				... DIN4	
5				0				... DIN5	
6				0				... DIN6	
7				0				... DIN7	
8				0				... DIN8	
9				0				... SS1 positive half wave	
10				0				... SS1 negative half wave	
11				0				... SS1 full-wave	
12				0				Reserved	
13				0				... SS2 positive half wave	
14				0				... SS2 negative half wave	
15				0				... SS2 full-wave	
16				0				Reserved	

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0408						Level inversion for digital inputs → inputs are LOW-active	📖 42
	RW	EXT	1	0	1 255		
					Possible values	Add values of the inverted inputs: e. g. DIN1, DIN3 and DIN5 are LOW-active → C0408 = 21.	
					0 No inversion		
					1 DIN1		
					2 DIN2		
					4 DIN3		
					8 DIN4		
					16 DIN5		
					32 DIN6		
					64 DIN7		
					128 DIN8		

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0409						Logic operations of digital input signals Link ORx = OR operation Link ANDx = AND operation	📖 44
1	RW	EXT	2	0	0 65535	Link OR1	
2				0		Link OR2	
3				0		Link OR3	
4				0		Link OR4	
5				0		Link OR5	
6				0		Link OR6	
7				0		Link OR7	
8				0		Link OR8	
9				0		Link AND1	
10				0		Link AND2	
11				0		Link AND3	
12				0		Link AND4	
13				0		Link AND5	
14				0		Link AND6	
15				0		Link AND7	
16				0		Link AND8	
					Possible values	Add values of the digital input signals to define a linkage: e. g. DIN1, SS1 full-wave and SS2 full-wave are to be assigned to link OR2 (OR operation) → C0409/2 = 17409.	
					0 No linkage		
					1 DIN1		
					2 DIN2		
					4 DIN3		
					8 DIN4		
					16 DIN5		
					32 DIN6		
					64 DIN7		
					128 DIN8		
					256 SS1 positive half wave		
					512 SS1 negative half wave		
					1024 SS1 full-wave		
					2048 Reserved		
					4096 SS2 positive half wave		
					8192 SS2 negative half wave		
					16384 SS2 full-wave		
					31768 Reserved		

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0410							Linking digital input signals to an internal device function ...	📖 46
1	RW	EXT	4	0		Not assigned	... Motor V1 (incl. brake)	
2				0		Not assigned	... Motor V2 (incl. brake)	
3				0		Not assigned	... Motor V3 (incl. brake)	
4				0		Not assigned	... Motor V4 (incl. brake)	
5				0		Not assigned	... Motor V5 (incl. brake)	
6				0		Not assigned	... Motor V6 (incl. brake)	
7				0		Not assigned	... Motor V7 (incl. brake)	
8				0		Not assigned	... Motor V8 (incl. brake)	
9				0		Not assigned	... CW/CCW rotation of motor ● CW rotation = LOW ● CCW rotation = HIGH	
10				0		Not assigned	Reserved	
11				0		Not assigned	... Set fault	
12				0		Not assigned	...Acknowledge fault	
13				0		Not assigned	... Frequency inverter: change over parameter set ● Parameter set 1 = LOW ● Parameter set 2 = HIGH	
14				0		Not assigned	... DC-injection braking	
15				0		Not assigned	... Open brake	
16				0		Not assigned	... Stop1	
17				0		Not assigned	... Stop2	
18				0		Not assigned	... Stop3	
19				0		Not assigned	... Stop4	
20				0		Not assigned	... Frequency limitation 1	
21				0		Not assigned	... Frequency limitation 2	
22				0		Not assigned	... Frequency limitation 3	
23				0		Not assigned	... Frequency limitation 4	
24				0		Not assigned	... SensoPart: change over parameter set ● Parameter set 1 = LOW ● Parameter set 2 = HIGH	
25				0		Not assigned	... Deactivate control	

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0410						(Continuation) Linking digital input signals to an internal device function ...	🕮 46
					Possible values		
					0 Not assigned		
					1 DIN1	Digital input DIN1	
					2 DIN2	Digital input DIN2	
					3 DIN3	Digital input DIN3	
					4 DIN4	Digital input DIN4	
					5 DIN5	Digital input DIN5	
					6 DIN6	Digital input DIN6	
					7 DIN7	Digital input DIN7	
					8 DIN8	Digital input DIN8	
					9 SS1 positive half wave	Control bar 1 positive half wave	
					10 SS1 negative half wave	Control bar 1 negative half wave	
					11 SS1 full-wave	Control bar 1 full-wave	
					12 Reserved		
					13 SS2 positive half wave	Control bar 2 positive half wave	
					14 SS2 negative half wave	Control bar 2 negative half wave	
					15 SS2 full-wave	Control bar 2 full-wave	
					16 Reserved		
					... ...		
					31 Reserved		
					32 Link OR1	Result of OR operation 1	
					33 Link OR2	Result of OR operation 2	
					34 Link OR3	Result of OR operation 3	
					35 Link OR4	Result of OR operation 4	
					36 Link OR5	Result of OR operation 5	
					37 Link OR6	Result of OR operation 6	
					38 Link OR7	Result of OR operation 7	
					39 Link OR8	Result of OR operation 8	
					40 Link AND1	Result of AND operation 1	
					41 Link AND2	Result of AND operation 2	
					42 Link AND3	Result of AND operation 3	
					43 Link AND4	Result of AND operation 4	
					44 Link AND5	Result of AND operation 5	
					45 Link AND6	Result of AND operation 6	
					46 Link AND7	Result of AND operation 7	
					47 Link AND8	Result of AND operation 8	
					48 Reserved		
					... ...		
					63 Reserved		

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0410						(Continuation) Linking digital input signals to an internal device function	🕮 46
					64	HWC match code 1	HWC match code 1	
					65	HWC match code 2	HWC match code 2	
					66	HWC match code 3	HWC match code 3	
					67	HWC match code 4	HWC match code 4	
					68	HWC match code 5	HWC match code 5	
					69	HWC match code 6	HWC match code 6	
					70	HWC match code 7	HWC match code 7	
					71	HWC match code 8	HWC match code 8	
					72	HWC match code 9	HWC match code 9	
					73	HWC match code 10	HWC match code 10	
					74	HWC match code 11	HWC match code 11	
					75	HWC match code 12	HWC match code 12	
					76	HWC match code 13	HWC match code 13	
					77	HWC match code 14	HWC match code 14	
					78	HWC match code 15	HWC match code 15	
					79	HWC match code 16	HWC match code 16	
					80	Reserved		
					...	...		
					95	Reserved		
					96	HWC-OR1	Result of HWC OR operation	
					97	HWC-OR2	Result of HWC OR operation	
					98	HWC-OR3	Result of HWC OR operation	
					99	HWC-OR4	Result of HWC OR operation	
					100	HWC-OR5	Result of HWC OR operation	
					101	HWC-OR6	Result of HWC OR operation	
					102	HWC-OR7	Result of HWC OR operation	
					103	HWC-OR8	Result of HWC OR operation	
					104	Reserved		
					...	...		
					252	Reserved		
					253	Fixed LOW	Signal level always is LOW	
					254	Fixed HIGH	Signal level always is HIGH	
					255	Not assigned		

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0415							Linking internal status signals to digital output signal ...	📖 50
1	RW	EXT	4	0		Not assigned	...Digital output DOUT1	
2				0		Not assigned	...Digital output DOUT2	
3				0		Not assigned	Reserved	
4				0		Not assigned	Reserved	
5				0		Not assigned	... Message bar1 positive half wave	
6				0		Not assigned	... Message bar1 negative half wave	
					Possible values			
					0	Not assigned		
					1	Motor V1 active		
					2	Motor V2 active		
					3	Motor V3 active		
					4	Motor V4 active		
					5	Motor V5 active		
					6	Motor V6 active		
					7	Motor V7 active		
					8	Motor V8 active		
					9	Motor CCW rotation active		
					10	Reserved		
					11	Fault active		
					12	Reserved		
					13	Frequency inverter: parameter set 2 active		
					14	Reserved		
					15	Brake is open		
					16	Stop 1 active		
					17	Stop 2 active		
					18	Stop 3 active		
					19	Stop 4 active		
					20	Frequency limitation 1 active		
					21	Frequency limitation 2 active		
					22	Frequency limitation 3 active		
					23	Frequency limitation 4 active		
					24	SensoPart: parameter set 2 active		
					25	Reserved		
					...	...		
					29	Reserved		
					30	HWC code range active		
					31	Reserved		

Code				Possible settings		Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection		
C0415						(Continuation) Linking internal status signals to digital output signal ...	📖 50
					Possible values		
					32 Motor is running		
					33 Reserved		
					34 Status On/Off: OFF active		
					35 Status On/Off: OFF active or fault active		
					36 Status On/Off: OFF active or fault active or Stop 1 active or manual Ir operation active		
					37 Reserved		
					38 Stop 1, 2, 3, 4 active or SensoPart active		
					39 Frequency limitation 1, 2, 3, 4 active or SensoPart active		
					40 Reserved		
					41 Reserved		
					42 SensoPart: Stop active		
					43 SensoPart: frequency limitation active		
					44 Reserved		
					... ...		
					50 Reserved		
					51 Start-up warning or fault active		
					52 Reserved		
					... ...		
					59 Reserved		
					60 IrDA positioning active		
					61 IrDA position reached		
					62 Reserved		
					... ...		
					252 Reserved		
					253 Fixed LOW	Signal level always is LOW	
					254 Fixed HIGH	Signal level always is HIGH	
					255 Not assigned		

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0416								Level inversion for digital outputs → outputs are LOW-active	📖 49
	RW	EXT	1	0	1		255		
					Possible values			Add values of the inverted outputs: e. g. DOUT1 and message bar1 negative half wave are LOW-active → C0416 = 33.	
					0	No inversion			
					1	DOUT1			
					2	DOUT2			
					4	Reserved			
					8	Reserved			
					16	Message bar1 positive half wave			
					32	Message bar1 negative half wave			
					64	Reserved			
					128	Reserved			
C0420	RW	EXT	4	0				Deceleration time: start-up after mains connection V0 ⇨ Vx	📖 52
					0	{ms}	20000		
C0421	RW	EXT	4	0				Deceleration time: start-up after On/Off switch to ON V0 ⇨ Vx	📖 52
					0	{ms}	20000		
C0422	RW	EXT	4	0				Timer for starting delay function with start-up warning signal V0 ⇨ Vx starting delay function	
					0	{ms}	20000		
C0430								Configuration of function ...	📖 54
1	RW	EXT	4	3				... Stop 1	
2				3				... Stop 2	
3				3				... Stop 3	
4				3				... Stop 4	
					Possible values				
					1	Stop x only active in the case of CW rotation			
					2	Stop x only active in the case of CCW rotation			
					3	Stop x active in the case of CW and CCW rotation			
C0432								delay time: start-up V0 ⇨ Vx after ...	📖 54
1	RW	EXT	4	0	0	{ms}	20000	... Stop 1	
2				0				... Stop 2	
3				0				... Stop 3	
4				0				... Stop 4	
C0433								delay time: start of deceleration ramp Vx ⇨ V0 after command ...	📖 54
1	RW	EXT	4	0	0	{ms}	20000	... Stop 1	
2				0				... Stop 2	
3				0				... Stop 3	
4				0				... Stop 4	

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0434								Deceleration ramp Vx ⇨ V0 for ...	📖 54
1	RW	EXT	4	50	1	{Hz/s}	255	... Stop 1	
2				50				... Stop 2	
3				50				... Stop 3	
4				50				... Stop 4	
C0440								Configuration of function ...	📖 55
1	RW	EXT	4	3				... Frequency limitation 1	
2				3				... Frequency limitation 2	
3				3				... Frequency limitation 3	
4				3				... Frequency limitation 4	
					Possible values				
					1	Frequency limitation only active in the case of CW rotation			
					2	Frequency limitation only active in the case of CCW rotation			
					3	Frequency limitation active in the case of CW and CCW rotation			
C0441								Drive frequency for ...	📖 55
1	RW	EXT	4	0	0	{Hz}	120.0	... Frequency limitation 1 (VL1)	
2				0				... Frequency limitation 2 (VL2)	
3				0				... Frequency limitation 3 (VL3)	
4				0				... Frequency limitation 4 (VL4)	
C0442								delay time: acceleration VLx ⇨Vx after deactivation of ...	📖 55
1	RW	EXT	4	0	0	{ms}	20000	... Frequency limitation 1	
2				0				... Frequency limitation 2	
3				0				... Frequency limitation 3	
4				0				... Frequency limitation 4	
C0443								delay time: start of deceleration ramp Vx ⇨ VLx after command ...	📖 55
1	RW	EXT	4	0	0	{ms}	20000	... Frequency limitation 1	
2				0				... Frequency limitation 2	
3				0				... Frequency limitation 3	
4				0				... Frequency limitation 4	
C0444								Deceleration ramp Vx ⇨ VLx for ...	📖 55
1	RW	EXT	4	50	1	{Hz/s}	255	... Frequency limitation 1	
2				50				... Frequency limitation 2	
3				50				... Frequency limitation 3	
4				50				... Frequency limitation 4	
C0450	RW	EXT	4	0				"Open brake" function: configuration	📖 56
					0	Brake opens immediately		Brake opens if C0410/15 = HIGH	
					1	Brake opens with delay		Brake opens if C0410/15 = HIGH and drive frequency = 0 Hz	

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0451	RW	EXT	4	0				”Open brake” function: maximum activation time	📖 56
					0	{s}	1000	● C0451 = 0 s: – Brake opens if C0410/15 = HIGH – Brake closes if C0410/15 = LOW ● C0451 > 0 s: – Brake opens if C0410/15 = HIGH – Brake closes after the time set if C0410/15 = HIGH	
C0460	RW	EXT	4	1				SensoPart: configuration	📖 57
					0	SensoPart inactive			
					1	SensoPart active - 57.6 kBaud			
					2	SensoPart active - 62.5 kBaud			
					3	SensoPart active - 38.4 kBaud			
					4	SensoPart active - 19.2 kBaud			
					5	SensoPart active - 9.6 kBaud			
					6	SensoPart active - 4.8 kBaud			
C0461	RW	EXT	4	500				SensoPart: distance for quick disconnection	📖 57
					0	{mm}	65535		
C0462								SensoPart: stop distance in ...	📖 57
1	RW	EXT	4	2000	0	{mm}	65535	... Parameter set 1	
2				2000				... Parameter set 2	
C0463								SensoPart: hysteresis for stop distance in ...	📖 57
1	RW	EXT	4	100	0	{mm}	65535	... Parameter set 1	
2				100				... Parameter set 2	
C0464								SensoPart: traverse path with creeping speed VS in ...	📖 57
1	RW	EXT	4	50	0	{mm}	65535	... Parameter set 1	
2				50				... Parameter set 2	
C0466								SensoPart: drive frequency for creeping speed VS in ...	📖 57
1	RW	EXT	4	5.0	0	{Hz}	120.0	... Parameter set 1	
2				5.0				... Parameter set 2	
C0467								SensoPart: delay time: start of the acceleration V0 ⇨ VS in ...	📖 57
1	RW	EXT	4	1000	0	{ms}	20000	... Parameter set 1	
2				1000				... Parameter set 2	
C0468								SensoPart: deceleration ramp for stop VS ⇨ V0 in ...	📖 57
1	RW	EXT	4	50	1	{Hz/s}	255	... Parameter set 1	
2				50				... Parameter set 2	

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0469	RW	EXT	1	0				SensoPart step monitoring:	📖 57
					0	Step monitoring inactive			
					1	Step monitoring active			
C0470	RW	EXT	1	10				SensoPart step monitoring:	📖 57
					2	{s}	20	Error delay	
C0472								SensoPart: distance for switch-over to approach speed ...	📖 57
1	RW	EXT	4	4000	0	{mm}	65535	... Parameter set 1	
2				4000				... Parameter set 2	
C0473								SensoPart: hysteresis for short distance in ...	📖 57
1	RW	EXT	4	100	0	{mm}	65535	... Parameter set 1	
2				100				... Parameter set 2	
C0476								SensoPart: drive frequency for approach speed in ...	📖 57
1	RW	EXT	4	20.0	0	{Hz}	120.0	... Parameter set 1	
2				20.0				... Parameter set 2	
C0478								SensoPart: deceleration ramp Vx ⇨ VLx for frequency limitation distance in ...	📖 57
1	RW	EXT	4	50	1	{Hz/s}	255	... Parameter set 1	
2				50				... Parameter set 2	
C0480	RW	EXT	4	2				Activation method for infrared remote control Ir-RC	📖 68
					0	Ir-RC inactive			
					1	Activation by key [green]		How to activate the manual infrared operation: 1. Press key [green] for approx. 1 second. 2. Manual infrared operation is active.	
					2	Activation by key [green] and three-digit code		How to activate the manual infrared operation: 1. Press key [green] for approx. 1 second. 2. Automatic operation is interrupted. 3. In the 7-segment display a three-digit number is shown. 4. Enter this number correctly via the IR-RC keys within the next 5 seconds. 5. Manual infrared operation is active. If the entry is incorrect, the vehicle control system automatically switches over to automatic operation again.	
C0481	RW	EXT	4	0				Infrared remote control display switch-over	📖 68
					0	IR-RC display switch-over not active			
					1	IR-RC display switch-over with keys [↑], [↓], and [F1] active			

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0491	RW	EXT	2	150				IrDA positioning approach path	📖 66
					0	{mm}	2000		
C0492	RW	EXT	4	5.0				IrDA positioning approach speed	📖 66
					1	{Hz}	50.0		
C0493	RW	EXT	1	50				IrDA positioning deceleration time	📖 66
					1	{Hz/s}	255		
C0495	RW	EXT	2	3				IrDA positioning braking distance correction	📖 66
					1	{mm}	100		
C0496	RW	EXT	2	3				IrDA positioning position window	📖 66
					1	{mm}	100		
C0500	RW	EXT	4	0				Display code for 7-segment display	📖 80
					0	Standard display			
					1	Drive frequency with sign [Hz]			
					2	DC-bus voltage [V]			
					3	Motor current [A]			
					5	Output stage temperature [°C]			
					7	Status of the digital inputs and control bars [hex]			
					8	Status of the digital outputs and message bars [hex]			
					9	SensoPart: distance [mm]			
					10	Status of the seconds counter [s]			
					11	HWC command status			
					12	Status of encoder position [mm]			
					13	Status of system deviation [mm]			
					15	IrDA position value [mm]			
					201	Reserved for customer-specific displays			
C0520								Disposable data memory 6 characters (e. g. for carriage number)	
1	RW	EXT	1	0	0	{ASCII}	255	Character 1	
2				0				Character 2	
3				0				Character 3	
4				0				Character 4	
5				0				Character 5	
6				0				Character 6	
C0521								Disposable data memory 8 characters (e. g. for serial number of carriage)	
1	RW	EXT	1	0	0	{ASCII}	255	Character 1	
2				0				Character 2	
3				0				Character 3	
4				0				Character 4	
5				0				Character 5	
6				0				Character 6	
7				0				Character 7	
8				0				Character 8	

Code				Possible settings				Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection				
C0522								Disposable data memory 32 characters (e. g. for freight ID)	
1	RW	EXT	1	0	0	{ASCII}	255	Character 1	
2				0				Character 2	
3				0				Character 3	
4				0				Character 4	
5				0				Character 5	
...				0				...	
31				0				Character 31	
32				0				Character 32	
C0523	R	EXT	4					Checksum for C0520, C0521 and C0522	
					0		4294967295		
C0601	R		2					Status of digital inputs (bit coded)	📖 75
					0		65535		
					Bit 0	Status DIN1		Digital input DIN1	
					Bit 1	Status DIN2		Digital input DIN2	
					Bit 2	Status DIN3		Digital input DIN3	
					Bit 3	Status DIN4		Digital input DIN4	
					Bit 4	Status DIN5		Digital input DIN5	
					Bit 5	Status DIN6		Digital input DIN6	
					Bit 6	Status DIN7		Digital input DIN7	
					Bit 7	Status DIN8		Digital input DIN8	
					Bit 8	Status SS1 positive half wave		Control bar 1 positive half wave	
					Bit 9	Status SS1 negative half wave		Control bar 1 negative half wave	
					Bit 10	Status SS1 full-wave		Control bar 1 full-wave	
					Bit 11	Reserved			
					Bit 12	Status SS2 positive half wave		Control bar 2 positive half wave	
					Bit 13	Status SS2 negative half wave		Control bar 2 negative half wave	
					Bit 14	Status SS2 full-wave		Control bar 2 full-wave	
					Bit 15	Reserved			

Code				Possible settings			Description	
No.	⇧⇩	🖫	Byte	Lenze	Selection			
C0602	R		2				Status of logic operations (bit coded)	📖 75
					0	65535		
					Bit 0	Status link OR1	OR operations	
					Bit 1	Status link OR2		
					Bit 2	Status link OR3		
					Bit 3	Status link OR4		
					Bit 4	Status link OR5		
					Bit 5	Status link OR6		
					Bit 6	Status link OR7		
					Bit 7	Status link OR8		
					Bit 8	Status link AND1	AND operations	
					Bit 9	Status lnk AND2		
					Bit 10	Status link AND3		
					Bit 11	Status link AND4		
					Bit 12	Status link AND5		
					Bit 13	Status link AND6		
					Bit 14	Status link AND7		
					Bit 15	Status link AND8		
C0603	R		1				Status of digital outputs (bit coded)	📖 75
					0	255		
					Bit 0	Status DOUT1	Digital output DOUT1	
					Bit 1	Status DOUT2	Digital output DOUT2	
					Bit 2	Reserved		
					Bit 3	Reserved		
					Bit 4	Status MS1 positive half wave	Message bar 1 positive half wave	
					Bit 5	Status MS1 negative half wave	Message bar 1 negative half wave	
					Bit 6	Reserved		
					Bit 7	Reserved		
C0605	R		1				Status of current HWC command	📖 70
					0	201		
C0606	R		2				Status of encoder position value	📖 70
					0 {mm}	65535		
C0607	R		2				Status of system deviation	📖 70
					0 {mm}	32768		
C0610	R		4				SensoPart: current distance	📖 57
					0 {mm}	65535		
C0612	R		2				Status of IrDA position value [mm]	📖 66
					0 {mm}	32768		
C0620	R	EXT	4				Parameters: checksum (without C0520, C0521, C0522 and C0523)	📖 75
					0	4294967295		

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